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ACCOUNT

RHEUMATIC INFLAMMATION OF THE EYE,

WITH

OBSERVATIONS

ON THE

TREATMENT OF THE DISEASE.

BY

JAMES WARDROP, ESQ. F.R.S. ED.

Read Dec. 22, 1818.

THE word Ophthalmia is a generic term, under which are comprehended several distinct species of Inflammation of the Eye. Some of these species have been well defined and accurately described by nosologists, but there are others vaguely understood, and no account of them has been given except some ill connected histories of symptoms under the general description of Ophthalmia. I have pointed out in another place* that the inflammation of each particular texture of the eye is accompanied with a distinct class of symptoms, each assemblage characterizing one species of Ophthalmia.

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* Essays on the Morbid Anatomy of the Eye. Vol. I.

But there are other kinds of inflammation which derive their character, not from the peculiarity of the texture inflamed, but from being produced from some specific virus. Hence the Gonorrheal, the Syphilitic, the Scrofulous, the Gouty, and the Rheumatic Inflammations of the eye; all of which are accompanied with symptoms different from those of simple inflammation of any of the textures which compose that organ.

I propose on this occasion only to give an account of the Rheumatic Ophthalmia, to point out those peculiarities which distinguish it from other inflammations of the eye, and to explain the mode of treating the disease. The materials indeed of which the present paper is composed, were embodied in one which on a former occasion I had the honor of laying before the Society*, but which it was afterwards considered would better form the subject of a distinct essay.

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* On the effects of evacuating the Aqueous Humor, &c. Vol. IV.

Local Symptoms of the Disease.

The Rheumatic Ophthalmia derives its character both by the peculiarity of the local and constitutional symptoms.

The external appearances of Rheumatic Inflammation of the eye, are sufficiently striking to enable an accurate observer to distinguish it from other inflammatory affections of that organ.

The red colour which the albuginea acquires in this inflammation is not the bright crimson which accompanies the inflamed cornea, nor is the redness confined to one part as in the Pustular Ophthalmia. Neither have the vessels that peculiar mode of ramification, nor are the trunks so superficial, nor is there the puriform discharge which accompanies the inflamed conjunctiva. The albuginea acquires a brick red tinge, or an admixture of yellow with crimson red; and this peculiarity of colour is probably produced by the serous part of the blood being tinged with bile, an effect likely to take place from the marked derangement of the biliary organs which usually accompanies this disease. The shade of yellow however varies a good deal, being in some cases very remarkable, and in others much less perceptible.

The bloodvessels are generally equally numerous over the whole white of the eye, passing forwards in nearly straight lines from the posterior part of the eyeball and advancing close to the cornea; but neither passing over it nor leaving the pale circle around it, which is so striking when either the choroid coat or iris is inflamed. If the vessels be closely examined, the general redness will be found produced more from numerous small ramifications than a few large trunks*.

There is frequently a little swelling of the conjunctiva, and sometimes it forms a slightly elevated ring round the circumference.

In mild cases, in the early stage of the complaint little apparent change takes place in the anterior chamber, but as the disease advances the cornea becomes dull and turbid, and sometimes there is even a considerable degree of obscurity which does not appear in the form of a distinct speck but of a general cloudiness, more opake in the center and diminishing towards the circumference of the cornea.

If closely examined there is generally one or more parts where the corneal conjunctiva appears to be abraded; and these abrasions are usually near its circumference, though they may also be occasionally observed on all parts of the corneal surface.

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* These appearances in the colour and mode of distribution of the bloodvessels are represented in the drawing, Plate 1.

At the commencement of the disease there is often a disagreeable feeling of dryness of the eye, but sooner or later a very copious secretion of tears takes place.

If the eyelids be examined when the eye is affected with Rheumatic Ophthalmia, they are found only slightly swelled, and the number of blood-vessels on their internal surface but little increased.

The seat as well as the kind of pain affords striking characters of this peculiar affection. Generally the chief seat of pain at the commencement of the disease is in the head, though it sometimes also affects the eyeball itself. The pain is usually most severe in the temple of the affected side, but it is often seated in the brow, the cheek-bone, the teeth, or the lower jaw. Sometimes the pain is precisely confined to one half of the head, and sometimes there is a severe pain in the cavity of the nose or in the ear. These pains are more of a dull agonizing kind than acute; and though in this disease the pain be unceasing, yet it varies much in degree, coming on at times in very severe paroxysms, and recurring with great violence when the head is bent downwards. Sometimes the pain is excited by merely touching the scalp, and the patient is unable to rest his head on the affected side or even lean it on a pillow.

The pain in most cases is remittent, the paroxysm coming on at four, six, or eight o'clock in the evening, continuing during the night, being most severe about midnight, and suffering an abatement towards morning.

In the eyeball the patient generally complains more of a sense of fulness and distention than of pain; and though there is a great degree of external redness in this disease, the eye does not seem to suffer from exposure to light, for the eyelids are kept open without appearing to create uneasiness; whereas in most other inflammatory affections of this organ even a very moderate quantity of light cannot be endured.

This peculiarity in the seat of pain in the Rheumatic Ophthalmia, may perhaps be satisfactorily explained from the texture of the eye which is affected, and the sympathy which that texture has with similar adjacent structures. This particular species of Ophthalmia appears to me to be chiefly seated in the sclerotic coat, which, like the dura mater and membranes lining the nose, frontal and maxillary sinuses, is of the fibrous class, and it is membranes of this kind which are commonly the seat of rheumatism in other parts of the body.

The sympathy between all these parts and the eye is reciprocal, for when the dura mater is inflamed, irritability and redness of the eye are its concomitant symptoms.

Besides the local symptoms, there is always more or less symptomatic fever accompanying Rheumatic Ophthalmia, which increases along with the pain towards evening, assuming the form of a severe febrile paroxysm. The pulse becomes frequent, and sometimes hard. The tongue is remarkably white and furred, accompanied with a bitter taste in the mouth, more or less nausea, and the skin is hot and dry. The functions of the primæ viæ are much deranged, the appetite being impaired, and the evacuations always changed in quality.

But the progress and severity of this disease vary much, the attack being sometimes very slight and soon going away, without permanently injuring the eye, whilst at other times it is extremely severe, in many instances continuing a long time and ultimately destroying the organ. This difference in severity may no doubt depend on a variety of causes, though it will in every case be influenced by the habits and modified by the constitution of the individual.

When the Rheumatic Inflammation is severe, the pain in the head, in some instances soon after the beginning of the disease, becomes agonizing, the redness of the eyeball increases, and the whole white of the eye is crowded with bloodvessels, the conjunctiva being at the same time swelled. At length ulceration commences in the cornea through which the aqueous humor is discharged, and the eyeball collapses, all pain at this time ceasing; or as I have in two instances observed, a quantity of a thick puriform fluid has formed in the posterior chamber, and burst through the sclerotic coat.

Rheumatic Ophthalmia may in many instances be traced to a sudden change of temperature. In one case this inflammation came on from the patient's having kept wet clothes on his head when over-heated. In another patient the disease came on after travelling during the night in a carriage with one side of his head close to an open window.

It is most frequent at particular seasons of the year, as in the spring months, and it not unfrequently follows the operations for cataract, particularly in patients who have previously had rheumatism in other parts of the body. Rheumatism may frequently be observed to attack a joint or part that has been injured.

Both sexes appear equally subject to the disease, and I have observed it most frequently in adults and those rather advanced in life.

Rheumatic Ophthalmia usually affects only one eye, but sometimes it attacks both, the inflammation being seldom so severe in the second eye as in that first affected.

From what has already been said of the Rheumatic Ophthalmia, it will be easy to point out those features of the disease by which it differs from other inflammatory affections of the eye. The puriform discharge sufficiently distinguishes it from the inflamed conjunctiva. The central opacity of the cornea, the intolerance of light, the colour and unequal distribution of the enlarged vessels on the white of the eye, the pain in the eyeball, these symptoms contrasted with the remitting pain in the sinuses around the orbit, the slight uneasiness from light, the bright red colour of the vessels, and the whole albuginea being covered by them, sufficiently characterize the Rheumatic Ophthalmia from simple inflammation of the cornea. It is however very apt to be confounded both with the *Syphilitic* and *Gouty* affections of the eye. And this is not surprising when we consider how difficult it is to discriminate in many instances between venereal, gouty, and rheumatic affections of joints.

The Rheumatic resembles the Syphilitic more than any other ophthalmia, and I have frequently seen instances of the one treated for the other. But they are to be distinguished from one another by the appearances of the inflammations, the progress of the diseases, and above all by the constitutional symptoms which accompany them. In the Rheumatic inflammation it has already been noticed that the proper vessels of the sclerotic coat are enlarged, which is the cause of the redness being generally diffused over the whole albuginea, whereas in the syphilitic inflammation it is the anterior ciliary arteries passing along the sclerotica on their way to the iris, which are chiefly affected ; and thus the pale ring which is always observed between the cornea and enlarged vessels in that disease.

Rheumatic and Syphilitic ophthalmia resemble each other in the accompanying pains around the orbit, and in their evening exacerbation. But those who have the syphilitic inflammation in the eye have always the constitutional symptoms of syphilis, and in tracing their origin they are found accompanied with a distinct history of that disease.

In the same manner also as rheumatism and gout are often combined in other organs, so are they found affecting the eye. In some instances the rheumatic affection begins first and then gout succeeds. But there are cases where the inflammation is purely arthritic.

When Gout affects the eye it has the same similarity to rheumatism and syphilis which these diseases have to one another when other parts of the body are affected with them. However the pure arthritic ophthalmia may easily be distinguished from the rheumatic; for like the syphilitic the gouty inflammation chiefly affects the capsule of the aqueous humor, producing thickening of that membrane, effusion of lymph in the anterior chamber, and adhesions of the edge of the iris with the capsule of the lens; and whilst these changes are going on, the cornea remains perfectly transparent.

Treatment.

In the Rheumatic Inflammation of the eye I have found the evacuation of the aqueous humor attended with much advantage. In those cases particularly where proper remedies had not been employed at an early period of the disease, where there was much pain in the brow or any other part of the head, where the cornea had become dim and clouded, and where vision was impaired, in all such cases the good effects of the operation were instantaneous; the pain of the head was removed and very seldom returned, and the transparency of the cornea was restored. When therefore the disease has made much progress, and when the symptoms have not been relieved by other remedies, the evacuation of the aqueous humor is a practice from which the most beneficial effects may be anticipated.

In those cases where the aqueous humor has been discharged, I found no applications were afterwards necessary but fomentations to the parts around the eye; and when the eye itself remained irritable some time after, it speedily recovered by the use of the vinous tincture of opium.

The affection of the biliary organs must claim during every period of the disease particular attention. In the early stages of this species of Ophthalmia, great relief is sometimes obtained from the exhibition of an emetic, and in some cases I have observed a complete alleviation of the pain of the head, with a remarkable diminution of the redness of the eye, even in a few hours after the operation of that remedy. The emetic I have usually employed is an ounce of the ipecacuanha wine, with one drachm of antimonial wine. After the emetic the bowels should be completely evacuated, and a couple of grains of calomel combined with a few of rhubarb may be two or three times given; also saline or other purgatives, if necessary, with a view to act on the biliary organs as well as empty the alimentary canal.

When the inflammation has succeeded a sudden chill, the functions of the skin should be restored by the judicious employment of sudorific medicines. A couple of grains of antimonial powder given singly or combined with opium every four or six hours is an excellent remedy, and their effects are particularly useful when a dose is taken a little before the evening paroxysm, as it frequently has the effect of allaying the pain and producing sleep.

Little advantage is derived from local bleeding. In a few cases where there is a tendency to plethora, a very full and hard pulse, and where relief has not been speedily obtained from the use of the other remedies, it may be necessary to take away some blood either from the arm, or by leeches, from the branches of the frontal veins and arteries. In general however patients affected with Rheumatic Ophthalmia, as with rheumatism in other parts of the body, cannot bear bleeding to a great extent. This remedy should therefore be employed with moderation. Indeed the little relief afforded by bleeding in this disease may be regarded as one of its diagnostic characters.

In the early stage of the complaint the pain of the eye and brow is sometimes much alleviated by using a fomentation of a decoction of poppy-heads. Blisters, too, repeatedly applied behind the ear, or to the nape of the neck, contribute along with other remedies to the cure of this disease; but they should not be applied near the eye.

The vinous tincture of opium is the only local application which I have ever observed to be decidedly beneficial; but its use should always be deferred till the latter period of the inflammation, when all febrile symptoms are subdued. A small quantity of this application may be put within the eyelids once or twice a day with a common camel's hair pencil, and its use persisted in whilst it affords relief.

After the *primæ viæ* have been well evacuated, the tongue may still remain very white and the pulse quicker than natural. In this state the greatest benefit is derived from the internal use of the *cinchona* singly or combined with the mineral acids.

The remarkable effects I had observed of cinchona in the cure of rheumatism of the joints first led me to employ it as a remedy in Rheumatic Ophthalmia, and it seems to possess as specific an effect in this disease as in ague. From the disordered state of the stomach it should only be given in small doses; generally from five to eight grains taken in a little warm water every two hours, or as often as the stomach can receive it, is sufficient. It sometimes purges the bowels considerably, and when this effect is produced I have not found it diminish its specific virtues. The good effects of this remedy are commonly soon seen, and its use may be persisted in according to the abatement of the symptoms.

The mineral acids are extremely useful in all rheumatic affections of the acute kind. To the powerful action which these remedies have on the biliary secretions, their good effects are perhaps to be attributed. They may be used from the very commencement of the treatment, or immediately after the action of the first purgative, and they may be freely used whilst taking cinchona. I have in general given a preference to the sulphuric acid, ten drops of which in its diluted state mixed with a teaspoonful of syrup of roses and a glass of cold water is extremely grateful, and may be taken from three to six times daily. In some cases I have also used with advantage turpentine, either singly or combined with the cinchona, or rhubarb. Mercury given in this disease so as to produce ptyalism, aggravates more than it mitigates the symptoms.

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MEMOIR

ON A

NEW MODE OF TREATING BRONCHOCELE,

BY DR. QUADRI, OF NAPLES.

COMMUNICATED IN

A LETTER FROM DR. SOMERVILLE TO THE PRESIDENT.

Read Dec. 22, 1818.

SIR,

IN the course of last Spring, I had occasion to see several operations performed for the cure of Bronchocele, by Dr. Quadri, an eminent Surgeon in Naples, which seemed so interesting, that I requested he would give me an account of his experiments, for the purpose of communicating it to this Society. With that attention which he lost no opportunity of shewing, he furnished me with an extract from that part of the journal relating to those cases, wherein I had seen either the operation or the effects resulting from it. I now have the honor to lay before the Society an abstract of

Dr. Quadri's letter to me, dated at Naples, the 29th of April, 1818.

I remain with great esteem,

Your most obedient humble servant,

W. SOMERVILLE.

SIR,

Every one knows that various internal remedies have been deemed adequate to accomplish the removal of Bronchocele, Goitre or Gozzo; such as burnt sponge, the animal oil of dippel, burnt woollen cloth, muriate of lime, &c.; but whether it proceed from these medicines disordering the stomach, or from the circumstance of some species of gozzo being of a nature not subject to their influence, or perhaps from the difficulty of duly preparing and administering them, to which last their failure is sometimes imputed by those who believe in their virtue, it is still unquestionable that Bronchocele is very prevalent. You even mentioned to me, that in travelling lately in Switzerland, you heard much of the efficacy of internal remedies in curing this disease, while your own observation proved its frequency, and moreover that even the families of eminent medical practitioners were not always exempt from it.

Having maturely considered the nature of the gozzo, the uncertainty, to say the least, of its cure by the use of internal remedies, as well as the dangers incident to its extirpation by the knife, it occurred to me to try the effect of passing a seton through the substance of the enlarged gland, with the view of exciting suppuration, and also such a degree of irritation as might stimulate the absorbent vessels to remove a portion of it.

The first experiment was made on the 14th of November, 1817, in the clinical ward of our hospital, in the presence of many colleagues, pupils and others. The subject of it was Maria Carolina Trichiella, a native of the village of Casoria, then residing in the convent of Saint Anthony at Pausilippo, of thirty-six years of age, and suckling a child three years old. The circumference of her neck at the thickest part, including the gozzo, was sixteen inches, French measure, and the greatest apparent breadth of the enlarged gland measured five inches. By means of a trochar pointed needle six and a half inches long, I passed a seton from above downwards through the gland, at the depth of about four lines from its surface; suppuration took place in forty-eight hours. On the 18th of November the seton escaped when the matter was squeezed out, and the irritation occasioned by replacing it, produced an abscess on the right side of the neck, which was opened on the 23d, when it was found that the suppuration had effected the destruction of nearly the whole gland. I shewed this woman to you on the 26th of April, 1818, free from gozzo, her neck measuring thirteen inches and six lines in circumference, instead of sixteen inches.

On the 23d of November I passed two setons, one on each side through the thyroid gland, in the direction of the longitudinal access of the neck of D. Concetta Panaro, from which copious suppuration resulted, with manifest benefit. It is however to be observed that the seton having been withdrawn from the left side of the neck, the superior orifice closed and a sinus formed, from which matter has continued to ooze these four months, the patient having obstinately refused to suffer a counter-opening to be made. The matter accumulates in a sac, from which it escapes by a very small aperture on the right side of the neck. The seton passed through the gland on the right side was retained six weeks with the best effect, the tumor on that side having disappeared, as you saw on the 8th of April, the circumference of the neck being then reduced to thirteen inches and two lines from fourteen inches.

On the 13th of December I passed a seton through an enlarged gland in the neck of Gelsumina Nuzzo, twenty-five years of age; the circumference of her neck, including the tumor, measured fifteen inches, the apparent breadth of the gozzo five and a half inches. The tumor was unusually hard, and the seton produced but little inflammation and scarcely any suppuration; little improvement was perceptible in a month, I therefore enlarged the seton not less than eight times, to increase the stimulus, but ineffectually; various acrid and corrosive substances were introduced, amongst others, oil of turpentine, spirit of wine, red precipitate, alum, diachilon plaister with gums, &c. but to no purpose. At length, on the 15th of March, 1818, I introduced two pieces of the root of black hellebore attached to the seton, each about an inch long and three lines in diameter. This soon occasioned extensive inflammation and suppuration, accompanied with such diminution of the tumor that the left side of it is almost gone. On the 1st of April another seton was passed through that portion of gozzo on the right side, to which a piece of hellebore has since been added, producing also inflammation and profuse suppuration; and the circumference of the neck is now reduced to fourteen inches and two lines from fifteen inches.

On the 4th of February I passed a seton from left to right transversely through a gozzo, on the neck of Antonia Mosca, a robust young woman, aged eighteen years, from Afragola. The tumor was soft, the circumference of the neck measured sixteen and a half inches, and the breadth of the tumor six inches. The seton produced inflammation throughout the left side of the gland, which was materially augmented by the introduction of hellebore on the 15th of March, and it was kept in the wound three days. In the end of March, after withdrawing the seton, the wound healed rapidly, scarcely leaving a vestige of gozzo on the left side, and such diminution had taken place on the right, that the neck now measured only fifteen inches. This girl had occasion to go to her family on the very day that I had determined to pass a seton on the right side of her neck.

The subject of the fifth experiment was Maddalena Pagone, also from Afragola, twenty years old, of a full habit of body, having a gozzo so hard, small and deep seated, that I could not fix the gland sufficiently to be able to penetrate its substance. The seton was then introduced superficially to the gland, but with so little advantage that it was removed in the end of March, and it was my intention to endeavour to pass a seton transversely through the gland, having fixed it with my left hand, but my patient chose to accompany her friend Mosca. The diminution of the gozzo only amounted to about five lines.

On the 6th of April Pagone, already mentioned, brought to the hospital her friend Maddalena Gentile, nineteen years old, a native of Afragola, having a large gozzo measuring six inches in breadth, the circumference of her neck nearly seventeen inches. Pagone had told her, that her gozzo being *feminine*, that is to say soft, was more likely to derive benefit from art, than her own or that of Nuzzo, both of which were *masculine*, a prognosis in which I concurred. The patient being of a timid disposition narrowly watched my hands while examining her neck, still declaring her willingness to submit to an operation, provided her mother consented. Under pretext however of measuring her neck, I passed a seton transversely through the greatest dimension of the tumor, at the depth of about six lines, without her even suspecting that the operation had been accomplished. I secured the seton by a knot, and permitted her immediately after the operation to walk home to Afragola, distant from Naples a few miles, and she came back to the hospital next morning to undergo the necessary treatment. The suppuration produced by this seton is so copious and so good, that I have not a doubt of the favorable termination of the case.

On the 13th of April Luigi Pagone, a boy of thirteen years of age, nephew of Maddalena abovementioned, came to my house, having a gozzo divided into two distinct portions, somewhat like testicles in the scrotum, the left larger and descending lower than the right; the circumference of the neck measured thirteen inches, the tumor was three inches broad. I introduced the needle, endeavouring to perforate the gland pretty deep, and there is little doubt of my having reached to the level of the larger branches of the thyroid arteries, for an unusual quantity of blood, perhaps more than an ounce, flowed from the wound. The tumor seemed to swell as if injected with blood, snow was therefore sent for to restrain the hemorrhage, but the application was not required, as the bleeding ceased spontaneously, and even the infiltration into the gland was no longer perceptible. The boy recovered from deliquium, which did not continue more than half a minute, and was able to walk from my house to the hospital. Every appearance was favourable on the 14th, and suppuration took place on the 15th.

From what has been stated, it is proved that it has been possible to pass a seton through the gozzo, sixteen times, varying the direction in every instance, without the occurrence of any untoward accident, while it seems to me to shew, that scarcely a possibility of danger is to be apprehended in performing this operation; of this I am so well satisfied, that although in the first five cases I thought it necessary to obtain the fullest concurrence of the patients and their relatives, and even then operated with some anxiety; the operation was however performed in the two last cases without apprising the patients. Unless the needle were pushed deep enough almost to touch the scutiform cartilage at its external edges, the principal trunks of the thyroid arteries will not be exposed to injury, while any others in the course of the needle will not be found large enough to occasion danger. No uneasiness arises from the injury of nerves lying in the way of the needle.

The following practical inferences may be drawn from a consideration of the cases narrated, namely, that it is not dangerous to perforate the Bronchocele with a trochar pointed needle, carried deep into the gland, provided it be not brought near the cartilage. 2dly. That the consecutive inflammation is productive of very trifling inconvenience to the patients, as we have seen in the instances of Trichiello and Panaro. 3dly. That in some cases the gozzo may be destroyed by simple mechanical means, as in the two first mentioned. 4thly. That when the irritation of the seton is not adequate to excite the requisite degree of inflammation, it may be successfully obtained by the introduction of hellebore. 5thly. That it is expedient to retain the seton in the tumor for a considerable length of time, in order to keep up the suppuration until a cure is accomplished, as well as to prevent the formation of sinuses, as in the case of Panaro. 6thly. That the beneficial effect of suppuration rarely extends throughout the whole substance of the gland, but in general only destroys that portion of it contiguous to the perforation.

The observations which follow are taken from my journal after a cure was nearly effected in the cases related:

1. In the immediate neighbourhood of the part through which the seton passes externally, an irregular fungous margin usually rises up, which it is expedient to remove with scissors, on withdrawing the seton, to prevent deformity.

2. After suppuration ceases, and the wounds are perfectly healed, the curative process goes on in some examples, and the gozzo continues to diminish until it is totally dissipated, as we have seen in the cases of Panaro, Nuzzo, and Mosca.

3. The skin which has been distended in covering the gozzo, remains corrugated a short time after the cure, but it soon resumes its natural appearance; this has happened especially to Trichiello.

4. The cicatrices left by the seton are at first dimpled, and the skin seems to adhere to the thyroid cartilage, along the course of the threads. Trichiello and Panaro had some degree of deformity arising from this circumstance, but in the course of two months it had diminished greatly in both.

In perforating the portion of gozzo that remained in the neck of Nuzzo, the needle met with a good deal of resistance at the part where the former seton had penetrated, shewing that the interior surface of the wound adheres, rendering it, in my opinion, extremely unlikely that a *gozzo* destroyed by seton should recur. It remains to be ascertained by experience whether or not every variety of gozzo admits of cure by seton? Whether or not hellebore should be resorted to in every instance, or is likely under any circumstances to produce bad consequences? I have seen severe vomiting ensue soon after the introduction of hellebore, but it soon subsided.

Extirpation of gozzo is said to have been unsuccessfully tried by many, particularly Dessault, of Paris, and I have lately heard that Professor Waller, of Landschut, in the course of last year tried to pass a ligature round the thyroid arteries, and by this means succeeded in curing gozzo; but this operation seems to me dangerous in the execution, and as yet uncertain in its result, as collateral branches very soon supply the place of obliterated trunks. It is not impossible that Professor Waller may have owed success to the inflammation and suppuration, and to the degree of absorption excited by the ligature acting as a seton.

Since I began to write this letter I have performed two operations similar to those already described, with favorable prospects, and I hope soon to be able to send you more observations on this subject.

I am, &c.

GEO. BATTISTA QUADRI.

ON
THE ELEPHANTIASIS,

AS IT APPEARS IN HINDOSTAN.

BY JAMES ROBINSON, ESQ.

SUPERINTENDANT OF THE INSANE HOSPITAL AT CALCUTTA.

COMMUNICATED

BY DR. BABINGTON.

Read Jan. 19, 1819.

THE Elephantiasis of the Greeks, or Lepra of the Arabians, is one of the most common diseases of Hindostan, where, however, it is much misunderstood, as two distinct varieties, if not different diseases, indiscriminately bear one name, and what is worse, are treated alike, though they require very opposite remedies. One variety exhibits the following symptoms:—one or two circumscribed patches appear upon the skin (generally the feet or hands, but sometimes the trunk or face) rather lighter coloured than the neighbouring skin, neither raised nor depressed, shining and wrinkled, the furrows not coinciding with the lines of the contiguous sound cuticle. The skin thus circumscribed is so entirely insensible, that you may with hot irons burn to the muscle before the patient feels any pain. These patches spread slowly until the skin of the whole of the legs, arms, and gradually often the whole body becomes alike devoid of sense: wherever it is so affected there is no perspiration, no itching, no pain, and very seldom any swelling. Until this singular apathy has occupied the greater part of the skin, it may rather be considered a blemish than a disease; nevertheless it is most important to mark well these appearances, for they are invariably the commencement of one of the most gigantic and incurable diseases that have succeeded the fall of man; and it is in this state chiefly (though not exclusively) that we are most able to be the means of cure. The next symptoms (which occur in some patients at two months, but in others not till after five or six years) are the first which denote internal disease or derangement of any functions. The pulse becomes very slow, from fifty to sixty, not small but heavy, "as if moving through mud;" the bowels are very costive, the toes and fingers numbed, as with frost, glazed and rather swelled, and nearly inflexible. The mind is at this time sluggish and slow in apprehension, and the patient appears always half asleep. The soles of the feet and the palms of the hands then crack into fissures dry and hard as the parched soil of the country, the extremities of the toes and fingers under the nails are encrusted with a furfuraceous substance, and the nails are gradually lifted up, until absorption and ulceration occur. Still there is little or no pain; the legs and fore arms swell and the skin is every where cracked and rough. Cotemporary with the last symptoms, or very soon afterwards, ulcers appear at the inside of the joints of the toes and fingers, directly under the last joint of the metatarsal or metacarpal bones, or they corrode the thick sole under the joint of the os calcis or os cuboides. There is no previous tumor, suppuration or pain, but apparently a simple absorption of the integuments, which slough off in successive layers of half an inch in diameter. A sanious discharge comes on; the muscle, pale and flabby, is in turn destroyed; and the joint being penetrated as by an auger, the extremity droops and at length falls a victim to this cruel, tardy, but certain poison. The wound then heals, and other joints are attacked in succession, whilst every revolving year bears with it a trophy of this slow march of death. Thus are the limbs deprived one by one of their extremities, till at last they become altogether useless. Even now death comes not to the relief of, nor is it desired by the patient, who "dying by inches," and a spectacle of horror to all besides, still cherishes fondly the spark of life remaining, and eats voraciously all he can procure: he will often crawl about with little but his trunk remaining, until old age comes on, and at last he is carried off by diarrhœa or dysentery, which the enfeebled constitution has no stamina to resist. Throughout the progress of this creeping but inveterate complaint the health is not much disturbed, the food is eaten with appetite, and properly though slowly digested; a sleepy inertness overpowers every faculty, and seems to benumb, almost annihilate every passion as well of the soul as of the body, leaving only sufficient sense and activity to crawl through the routine of existence. This I consider as a distinct variety of Elephantiasis, and from its most striking symptom would name Elephantiasis Anaisthetos. It is probably the "baras" of Avicenna, and is, at its commencement, called in India sooubharry. I have never seen the larger joints attacked, the nose destroyed, or any bones affected, save those of the hands and feet. The tuberculated species of Elephantiasis which I shall hereafter describe, sometimes supervenes, but is by no means connected with, caused by, or necessarily subsequent to this disease.

For the cure of this affliction our attention is first called to the state of the skin, which is the primary affections, and if we are called in during the first stage we may always give a favourable prognosis. I have tried almost every thing that has formerly been recommended, and very largely, but in vain; blood-letting, mercury, antimony, are singly of no use, but a happy combination of the two last with a medicine about to be described, applying at the same time topical stimulants, will generally succeed; indeed I have frequently known the sensibility restored entirely, and the disease thereby checked, by the application of a blister to the part, and keeping it open for a few days. Whenever the foot or hand alone is affected, I usually apply a strip of blistering plaister one inch and a half wide all round the limb, just upon the line which marks the sound from the affected parts. Where this is inapplicable from the extent of the disease, I apply a solution of muriate of mercury, made as follows:—℞. Hydr. muriat: gr. viij. Acid. muriat: gtt. xx. tere in vit. mort. deinde adde spt: vin. rectif: ℥ss. Aq. fontan. lb.ij M. This must be rubbed well upon the skin wherever affected. I at the same time give internally as follows: viz. for an adult, ℞ Calomelan. gr. ss. Pulv. antim. gr. iij. R. Pulv. cort. radicis asclepiæ giganteæ gr. vj. (ad x.) ter die. This last medicine, which is not in our Pharmacopœias, requires some description. It was communicated to me in 1812 by a Mr. Halked, as a discovery of Mr. Playfair, who afterwards himself favoured me with an account of it. I had hoped he would have given this to the world before now, but as he has not, I cannot refrain from here expressing how much I consider the profession and the world at large indebted to him for the discovery of the most valuable medicine hitherto derived from the vegetable kingdom. Mr. Playfair emphatically describes it as a "vegetable mercury" specific in the cure of lues venerea, leprosy and cutaneous eruptions in general, "the most powerful alterative hitherto known," and an excellent "deobstruent," and thus proceeds:—

" In all affections of the skin I have found it very effectual, and in the jugaru or leprosy of the joints I have never failed to heal up all the ulcers, and often have produced a perfect cure." In this last complaint, which until the three last years I considered leprosy, but which I now believe to be a species of Elephantiasis, I am prepared to agree with Mr. Playfair most fully as to the virtues of the asclepias, called in Hindostan, mudar. I can also bear witness to its powerful effects as a deobstruent and sudorific in almost all cutaneous eruptions, arising from obstructed perspiration and an apathy of the extreme vessels. Its action is quick and decided, causing a sense of heat in the stomach, which rapidly pervades every part of the system, and produces a titillating feel upon the skin from the renewed circulation through the minute vessels. It does not appear to be useful or indeed admissible, where the affection is inflammatory, or the eruption pustular. The great and rapid determination it causes to the skin has an obvious tendency to increase such diseases. I have tried it freely in lues venerea, but cannot venture to recommend it as a substitute for mercury; it will enable you to heal a chancre, but does not eradicate the poison. In the secondary symptoms, however, it is an admirable ally, superseding by its certain efficacy the exhibition of mezereon, sarsaparilla and other vegetables of doubtful utility. Where mercury has been used, but cannot be pushed safely any further, the mudar rapidly recruits the constitution, heals the ulcers, removes the blotches from the skin, and perfects the cure. The only part of the plant useful in medicine is the bark of the roots; it should be gathered in the months of March, April and May. The bark stripped from the root being well dried is readily beaten into a fine powder, of which the dose is from three to ten grains thrice a day for an adult; six grains is enough to commence with. As the plant grows wild everywhere throughout Hindostan, it may be applied advantageously externally. I have often used a poultice made of equal parts of this powder and linseed dust, with decided benefit in bad ulcers, from whatever cause, and even in gangrene; it acts as a detergent in cleansing the sore, and powerfully stimulates the healthy granulations. Decoctions may also be employed where the stomach would reject it in substance. When it causes pain in the stomach a few grains of magnesia or prepared kali added to each dose will prevent that effect. That this medicine is really the principal in the cure I have no doubt, for I scarcely ever succeeded by any means in curing or even checking the disease before I employed it, and have scarcely ever failed of doing both since.

The second species of Elephantiasis I would denominate E. Tuberculata, from the symptom which always accompanies and forms the most striking character of the disease. It usually commences with patches of the cuticle of the face becoming more florid, and, as Dr. Adams admirably expresses it, "appearing as if semitransparent, splendid, as if the surface were smeared with oil." It then gradually becomes thickened in different parts irregularly, giving a bloated and disgusting appearance to the visage. The alæ of the nose are usually first attacked, then the integuments of the cheeks, temples and lips, and lastly the ears, which I have often seen thrice the natural size, nor have I ever seen a case in which they were not affected. The disease in this stage sometimes affects the skin of the arms, hands, neck and chest, afterwards of the lower extremities and the lower part of the trunk. The skin is not insensible to the touch, but on the contrary there is generally a sense of heat and great itching in the tuberculated parts, which are circumscribed but most irregular; this symptom is followed after a long time by frequent headaches, a great sense of oppression and weight in the head, and a lethargic state of the mind; the tubercles sometimes grow so large and are so numerous as to occupy almost the whole of the face and head, and from their oily splendor they produce a most hideous effect; the pulse is slow and feeble, the voice becomes hoarse, and the uvula is generally absorbed without any perceptible ulceration; the vomer is then destroyed, the nose flattened, and after many years the bones of the palate and nose become carious. The disease now assumes the appearance of, and is often mistaken for, the secondary symptoms of lues venerea. It is in this species only of Elephantiasis, and in this only at its commencement, that the venereal passion is excessive, probably occasioned by the stimulating irritation of the skin; in the after stages the testicles are absorbed, and if the disease comes on before, it often prevents puberty. The fingers and toes do not (at least till a very late period) become at all numb, or in any way useless, except from the swelling of the skin. When in exertion the skin appears loose upon the body, and shakes on the parts affected as it does in anasarca. From this flabby fulness of the integument, the cheeks hang down, the wrinkles of course deepen, and the patient looks very much older than he is. This disease like its relation is slow and very long in progress. I have at this moment a boatman in my budgerow, who has had many tubercles all over his body; for above a year they increased, but, except the irritation they occasion, are productive of no diminution of his strength or health; he works as well and as long as the other, bears exposure to the sun as well, and is not apparently weaker; when he is rowing (which they always do standing) the loose flabbiness of the skin where affected is particularly striking; the skin has lost none of its sensibility, but on the contrary is itching constantly; his desires for venery *are more ardent* than before; his hair has not fallen off his eyebrows, chin, or pubes; his ears are twice as big as formerly, the alæ of the nose are swelled, the nostrils dilated, lips tumid, and voice hoarse, obscure and rather cracked, as if arriving at puberty, though he is thirty years of age. Dr. Bateman gives the most accurate account of Elephantiasis of any author I have read; and yet candidly says he has seen only two cases. He has separated as much as possible the confusion of writers; but still has necessarily mixed the two varieties, which in this country at least we find distinct.

The dropping of the extremities and insensibility of the skin belong to the first; the tubercles of the skin, ulcerations of the palate, and affection of the cartilages and bones of the face to the second variety. In the first the venereal passion is unaltered, and I have seen many healthy families of children spring from fathers with scarcely a finger or toe remaining; the hair does not drop off from these. In the second variety of Elephantiasis the mudar *does harm*, and is inadmissible. Arsenic in small doses is the most useful remedy I have yet found; but the certain cure is the grand desideratum. This is equal to the first in longevity; like that it does not affect the health for many years, and unless it attack the bones of the face and palate it does not affect life, nor does it produce the same stupefying effect upon the mind or body. Occasionally you see the patient overwhelmed with both at once, but this is an exception to the rule. I have described the last species less minutely because it is so well laid down by

Dr. Bateman, with the exceptions I have stated. One peculiarity which Dr. Bateman has not mentioned, and which I have generally met with in the second variety, is an oblong glandular swelling in the groin, exactly in the course of the vessels; this is almost always present when the testes are wasting. The hair does not necessarily fall off the pubes, nor does it for many years leave the eyebrows or chin of adults, though the disease prevents its growth when puberty has not taken place. In the *first* variety I consider Mudarrh, which aggravates the *second*, as the sole effectual remedy.

OBSERVATIONS

ON

DISEASES OF THE TEETH,

BY THOMAS BELL, ESQ. F.L.S.

COMMUNICATED

BY MR. TRAVERS.

Read Jan. 19, 1819.

AT a period when every department of the profession, and almost every disease has its particular votaries, it is much to be regretted that so little has been done towards affording a correct history of the diseases of the Teeth, and the parts connected with them. Some of them remain even yet undescribed, and others, though occasionally adverted to, are but little understood. Yet when the importance of the organs themselves both to our comfort and health is considered, as well as the consequences which frequently result from the neglect of them, whatever tends to the elucidation of their diseases, or points out the means of their prevention or cure, will not, it is presumed, be thought unworthy the notice of the profession.

The admission of the fact that the teeth possess vitality is *essential*, before we can possibly account for some of their morbid appearances. I believe that this theory is now generally received amongst those physiologists who have paid any attention to the subject; there are however still some men of high and deserved celebrity who hold the contrary opinion. Mr. Lawrence considers "the vascularity of the teeth, a doctrine refuted by every circumstance in the formation, structure and diseases of these organs*;" and Monsieur Blainville† distinguishes the tooth itself ("*la vraie dent*") by the words "la partie morte." This hypothesis was also very lately taught in one of the first medical schools in the world.

I shall not now enter into the numerous arguments which may be adduced in proof of the position that the teeth are strictly speaking *organized;* although I am convinced that this would not be difficult, either on the ground of analogy or experiment. I shall content myself with mentioning two simple and decisive facts, which neither require illustration, nor will allow of controversy.

CASE.

Mr. ——, a medical gentleman in London, requested me to extract the second molaris, on the right side of the lower jaw. He had for some time past been suffering the most excruciating pain, which still continued, and which although not exactly of the nature of common toothach arising from caries, was at times so severe as to be almost intolerable. He stated that some months previously he had taken cold, and had the usual symptoms of inflammation in the membrane of a tooth; since which time he had rarely had any interval of ease. The alveolar process and gum had undergone absorption, so that the fangs were in part exposed; and although there was not any external appearance of disease in the tooth, yet as it was productive of so much pain and had become so loose as to be totally useless, I immediately determined on its extraction, which occasioned as much pain as usually attends the operation. I then sawed the crown of the tooth through transversely, in order to ascertain if the state of the membrane would afford any satisfactory explanation of the symptoms, and found a cavity formed in the bony substance of the tooth, communicating with the natural cavity, and filled with pus. There was not the slightest appearance of that softness and discolouration which essentially characterize caries; on the contrary the texture of the surrounding bone remained unchanged, and possessed a remarkably firm and healthy appearance. (*Plate II. fig.* 1.) There is but one way of accounting for this. Here was a distinct case of abscess formed in the bone of a tooth; the membrane had been inflamed, suppuration followed, and the pressure of the pus occasioned *absorption.* How could this take place in an unorganized structure? The other fact to which I alluded, occurred to a friend of mine, who had a small portion of enamel splintered off from the anterior surface of an incisor, so that a very minute point of the bone was exposed. Touching this point with any sharp instrument, occasions pain of the most pungent kind, although there is not the least *general* tenderness in the tooth itself.

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* Blumenbach's Comp. Anat. translated by Lawrence, p. 67. note (O).

† Nouveau Dictionnaire d'Histoire Naturelle, &c. Art. "Dents."

Caries, the most common disease of the teeth, can only be explained by admitting their vitality. Some of the observations of the late Mr. Fox on this disease are not only obscure but inconsistent, and I shall take the liberty of making a few remarks on the subject, with the hope of in some measure elucidating it.

"The proximate cause of caries," says Mr. Fox*, "appears to be an inflammation in the bone of the tooth, which on account of its peculiar structure terminates in mortification." In the next page he endeavours to explain the mode in which this *effect* of inflammation takes place, by saying, "when the membrane" lining the cavity "becomes inflamed it separates from the bone, and the death of the tooth is the consequence. That this is the proximate cause of caries appears highly probable," &c. Now that the inflammation in these cases would not be confined exclusively either to the membrane or to the tooth itself, is sufficiently obvious from their intimate connection. The teeth, although organized, certainly possess less living power than any other part of the body, and therefore cannot recover from the effects of severe inflammation, and mortification or caries of some part of the crown is the consequence. But should the inflammation be sufficient totally to destroy the connection between the membrane and the tooth, then the whole tooth loses its vitality at once, and in some cases remains in the jaw, not having the appearance of caries, though it altogether becomes considerably darkened. This view of the subject will I think account for the fact that the fang is less liable to that kind of mortification which is understood by the term caries, than the crown; for as the fang appears to be originally possessed of a somewhat higher degree of vitality*, it is consequently better able to resist the effects of inflammation; but when it does lose its vitality, it is from its connection with the system being destroyed, and its source of nourishment cut off by the separation of the membrane.

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* Diseases of the Teeth, page 12.

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* It is to be remembered that in addition to the membrane lining the internal cavity, the fang is also externally covered by its proper periosteum, which is intimately connected with it by innumerable vessels.

On the same principle we may explain another striking circumstance; that *caries invariably commences at the external part of the bone, immediately under the enamel;* for it may be reasonably concluded that the more internal part being immediately connected with the membrane which supplies it with vessels and nerves, would be more highly organized than the external, and longer resist the effects of inflammation.

It is upon the same theory that I would attempt an explanation of the certain and regular *progress* of caries. A portion of the tooth is killed in consequence of severe inflammation, and of course becomes an extraneous body. In order to effect its removal, an increased action is set up in the contiguous portion, as in caries of bones; but here is the essential difference in its effects upon these two varieties of structure. For the reason before alluded to, viz. the imperfect organization of a tooth, this increased action itself causes the death of that part in which it is excited, and in this manner one portion after another is destroyed. Thus the same process which in more highly organized bones is the means which nature adopts to remove an extraneous portion and get rid of the disease, becomes in this instance the cause of its continued and irremediable extension.

I believe then that inflammation and mechanical injury are the *only* causes of caries: and I thus differ from those who assert that mere contact of a carious tooth occasions disease in one which was previously healthy. It is of importance that the truth or error of this opinion should be ascertained, and I shall therefore state the reasons which have led me to reject it; for it has been so universally believed, that even men of science and observation have suffered it to pass as an established fact, without considering whether a more philosophical and correct explanation may not be afforded of those circumstances which have given rise to it.

The whole crown of the tooth, that part in which caries almost always commences, is completely enveloped in a covering of enamel, which is composed of phosphate of lime. Now as caries originates in the bony substance, it is clear, that for disease to be produced from any merely external cause, either chemical or mechanical destruction of the enamel must first take place. But there is no agent evolved during the decomposition of a carious tooth, which can in any possible manner act upon the enamel; therefore the mere contact of a decayed tooth cannot affect a healthy one.

Still the circumstance is so common of disease occurring in two teeth situated close together, as to render it desirable to discover some less objectionable mode of accounting for it. I believe then that it arises from one of two causes. In the first place, it is reasonable to conclude, that any cause producing inflammation and consequent caries in any one tooth, would with equal probability have the same effect on the one in contact with it; and as one may be expected to have suffered more severely than the other, it would the more speedily shew symptoms of decay, and thus be supposed to *produce* the *caries* which should shortly after shew itself in its immediate neighbour.

The other cause to which I referred, is the pressure of the two teeth against each other, by which the enamel of both becomes more or less mechanically broken down at the point of contact, and thus the bony substance in both is more exposed to the action of the common causes of caries.

A considerable effusion of adhesive matter around the fang now and then occurs in consequence of severe inflammation. It appears to be thrown out from the vessels of the periosteum, and sometimes produces very distressing symptoms, which may perhaps be best illustrated by the following well marked case.

A gentleman some months since requested me to remove a molar tooth of the lower jaw, which gave him the most intolerable pain, darting in paroxysms from the tooth along the lower jaw, and towards the ear. The tooth was loosened and somewhat raised in the socket, and pressure so much augmented the pain that mastication was rendered impracticable. The disease was attributed by the patient to exposure to cold; and as no appearance of disease in the substance of the tooth itself could be discovered, I should have hesitated to extract it, were it not for the extreme severity of the pain, and my patient's earnest entreaties. The lower part of the fang was found completely enveloped in a thick coating of adhesive matter, the result of a very high degree of inflammation. (*Plate II. fig.* 2.) In other respects the tooth appeared healthy.

In a few days however all the molares *of that side*, both in the upper and lower jaw, were affected in a similar manner, and to as great a degree as the one I had extracted; they were in the same way raised somewhat above their natural level in the jaw, and produced equally severe pain on pressure; the face was much swelled, the submaxillary glands enlarged, the gums highly inflamed, and the most violent pain extended along the jaws behind the ear and over the forehead. Instead of complying with his reiterated entreaties to remove several of the teeth, I scarified the gums freely, and ordered a brisk purgative and an abstemious plan of diet. The next day finding that he was not relieved, I ordered some leeches to be applied to the gums, to the external part of the cheek and base of the lower jaw, a blister to be placed behind the ear, and that the bowels should be freely evacuated. Perseverance for a day or two in this plan totally removed the inflammation, and its consequences speedily disappeared; the teeth became as firm as ever, and in a short time he could masticate on that side as well as before the disease took place.

There is no doubt that in such cases as this the inflammation, if not timely checked, would terminate in suppuration. The appearances above described, may therefore be considered as constituting the first stage of those abscesses which are not unfrequently formed at the extremity of the fang, and which occasionally produce extensive disease of the alveolar processes and gums. If this be correct, a former opinion, that they arise *exclusively* from the irritation produced either by caries or by a fang remaining as an extraneous body in the socket must be erroneous, for in the case above alluded to, not one of the teeth was in the least degree affected with caries.

The appearances which these abscesses assume are various. *Plate II. fig.* 3. is a representation of one rather larger than ordinary; the sac containing the matter was lacerated in extracting the tooth. *Fig.* 4. is taken from a preparation in the collection of the late Mr. Joseph Fox, now in my possession, and is figured in his work. But the most remarkable specimen I have seen, is one which was given me by my friend Mr. Wickender, of Birmingham, consisting of a double sac at the extremity of the fang (*fig.* 5.) the portions being distinct from each other, and each apparently connected with the canal in the fang, which is probably in this case also double.

It appears then that the diseases which have been mentioned, however they may differ from each other in their nature, have but one common cause, namely, INFLAMMATION; and that were early attention paid to this circumstance, and decisive means had recourse to for its removal, much pain and much subsequent disease might be prevented. From the dense structure of the teeth, there is no possibility of their yielding in the slightest degree to the increased thickness of the membrane when inflamed; and from their being less perfectly organized than any other part, absorption goes on with extreme tardiness, even where it occurs at all. From these considerations it will appear important to prevent the occurrence of inflammation, or to remove it as speedily as possible. As a general rule, whatever produces pain in the teeth must be ultimately injurious. Taking food or liquors, the temperature of which is either much above or much below the standard heat of the body, is the most common cause of disease; and although such particulars may appear trifling, yet to those who have seen much of the effects produced by these diseases, and the anxiety and regret of those who either still suffer from them, or have been deprived of their teeth at an early period of life, the importance of any hints which may at all contribute to their preservation will be evident.

I am aware that the opinions which I have given in the course of the foregoing observations, are in many respects different from those previously held on these subjects; but I have been careful not to make assertions upon any grounds short of actual observation. My aim has been to induce additional attention to a subject which appears to me to possess considerable interest, and thus to lessen in some small degree the extreme frequency of diseases of the teeth, which often render persons even scarcely beyond the prime of life incapable of properly masticating their food, and thus not only deprive them of their comforts, but also lay the foundation of numerous diseases dependent upon imperfect digestion.

Fenchurch Street,
Dec. 1818.

CASES

OF

TUMORS WITHIN THE PELVIS

IMPEDING PARTURITION;

WITH REMARKS.

BY SAMUEL MERRIMAN, M.D. F.L.S.

PHYSICIAN-ACCOUCHEUR TO THE MIDDLESEX HOSPITAL,
AND TO THE PAROCHIAL INFIRMARY OF ST. GEORGE, HANOVER SQUARE,
AND CONSULTING PHYSICIAN-ACCOUCHEUR TO THE WESTMINSTER
GENERAL DISPENSARY.

Read Feb. 2, 1819.

IN the year 1812, I communicated to this Society "a case of Difficult Parturition, occasioned by a dropsical ovarium, forming a tumor in the lower part of the pelvis;" which was published in the third volume of the Transactions. Since that time some other cases of a similar nature have fallen under my observation, which I beg leave to lay before the Society, hoping that some useful practical inferences may be deduced from them.

CASE I.

Mrs. Franklin, twenty-eight years of age, was taken in labour of her first child in September, 1809, and was attended by Mr. Hanbury, a gentleman of established reputation and very extensively engaged in midwifery practice. After the labour had lasted upwards of forty hours, Mr. H. thought it expedient to endeavour by means of the lever to accelerate the delivery, but being unable to gain any advantage by the use of this instrument, he requested a consultation, and Dr. Denman was called in. By his advice the perforator was employed, and the most judicious attempts were then made to extract the child, but in vain. After many hours of exertion Dr. Denman wrote a note to me, requesting my assistance, but though I came unfatigued, and after much had been already accomplished, I was not able to effect the delivery in less than four hours after I began to operate. As the pelvis did not appear to be deformed, I was at a loss to account for the difficulties that had been experienced, but I presume that they arose from the tumor hereafter to be described, situated *above* the brim of the pelvis, for neither of us was sensible of the presence of such tumor within its cavity.

Mrs. Franklin, being pregnant a second time, was again attended by Mr. Hanbury, who now discovered a fleshy tumor in the vagina, very much intrenching upon the capacity of the pelvis. Fortunately for the mother the fœtus was *hydrocephalic;* this allowed the head to yield to pressure, and the child passed without any extraordinary assistance, but not till after nine hours of very severe labour.

She became pregnant a third time, and on Thursday, December 17, 1812, her labour commenced with slight pains. At 4 o'clock p. m. of the following day the *liquor amnii* was spontaneously discharged, soon after which the pains became very strong. On Saturday the 19th, notwithstanding the violence of the throes, so little progress was made that I was desired to visit her with my friend Mr. Hanbury. On examination I distinctly felt the tumor he had described. It occupied the back part of the pelvis, situated, however, not exactly in the middle, but rather to the left side; it pressed so firmly against the sacrum, as to impede the free passage of the finger up the rectum; and I computed that the space between its anterior surface and the symphysis pubis hardly equalled two inches in diameter. There was a good deal of elasticity in the tumor, which I believed to be formed by a diseased ovarium, and that its contents were fluid: and under this impression, and being confident that it would prove a most serious obstacle to delivery, I proposed that it should be punctured, to which Mr. Hanbury assented. But before this expedient was adopted, it was thought right to consult Dr. Denman, and both he and Mr. Croft examined the patient, but they objected to puncturing the tumor, not being satisfied that it contained a fluid;

and Dr. Denman thought, from his experience of her first labour, that the superior aperture of the pelvis was so much contracted from the projection of the lumbar vertebræ, as would render the perforator necessary, even if there were no impediment from the tumor. After much consideration, therefore, my proposition of puncturing the tumor was rejected, and it was determined to employ the perforator, if at the end of six hours no advantage was obtained from the natural pains.

At eight o'clock p. m. Mr. Hanbury made a free opening into the cranium, and evacuated some of its contents. Both he and I then tried to separate the bones, but we found the tumor so much in our way, as to frustrate all our endeavours. We therefore determined to wait several hours, hoping that the pains, which were moderately strong and recurred regularly, might force the head lower into the pelvis. At the end of twenty hours the head was sufficiently descended to allow Mr. H. to fix a blunt hook over the lower jaw, and thus he was enabled to exert a regular and steady extracting force, by which he at length succeeded in bringing the head into the world. Having gained this advantage, he endeavoured, by the increased power thus afforded, to extract the body of the child, but so great a degree of putrefaction had by this time taken place, that the vertebræ and integuments gave way, and the head was separated from the trunk. In this situation I again saw the patient, and assisted to bring down the shoulders and complete the delivery. After various ineffectual attempts the right arm was extracted, and we hoped by means of this to draw the thorax lower, but the arm likewise gave way, and was separated from the shoulder-joint. The removal of this, however, facilitated the extraction of the left arm, and ultimately by fixing a crotchet between the ribs, and making an opening into the distended abdomen, so as to discharge the fetid air and water which it contained, the delivery was effected and the placenta was at the same time expelled.

The entire duration of this labour was upwards of ninety hours, and forty-one hours elapsed after the cranium was perforated, before the delivery was completed. Mrs. Franklin remained for a long time in a state of extreme danger, and her recovery was very tedious and interrupted: the unremitting care and attention of Mr. Hanbury could not prevent a *stillicidium urinæ*, the consequence of her long sufferings, under which she still labours.

It has fallen to my lot to witness very many cases of delivery, after perforating the cranium, but infinitely more difficulty was experienced in this than in any other which has occurred within my knowledge. This difficulty was attributable, I am fully persuaded, to the bulk of the tumor, and not to distortion of the pelvic bones; and I still think, that to have punctured the tumor at an early period of the labour, would have been justifiable and good practice.

CASE II.

February 23, 1815, Mrs. Cobb, a patient of the Westminster General Dispensary, upwards of forty years of age, in labour of her first child, was attended by Mrs. Terry, a very intelligent midwife, who, finding an extraordinary fulness occupying the hollow of the sacrum, sent to me for advice and assistance.

On examination, I found a tumor, tense, elastic, lobulated on its surface, of an oval circumscribed figure, situated between the vagina and rectum, but rather inclined towards the left side of the pelvis. Conceiving that this was a displaced ovarium, and that it contained a fluid, I was desirous that it should be punctured, being well convinced that there was not room for an entire child to pass; but I hoped, if the tumor could be diminished, that the child might be born alive. Under this impression I requested my friend and colleague, Mr. Chevalier, then surgeon to that charitable institution, to see the patient and give his opinion of the propriety of such an operation, and as he agreed with me as to the probability of success, it was decided to make the puncture.

It now became a question whether the tumor should be punctured through the vagina, as had been done in the case of Dr. John Ford's patient*, and by Mr. Park, of Liverpool †, or through the rectum, but it was thought that some advantages would accrue from puncturing through the rectum, and there the opening was made.

There was no great difficulty in performing this operation, but on withdrawing the trocar we were disappointed, in not perceiving any discharge through the canula; this therefore was removed, and its extremity was then discovered to be clogged up with a substance of a greyish white color, of a granulated texture and of the consistence of honey. Though the contents of the tumor were thus ascertained to be too much inspissated to pass through the canula of a trocar, yet we hoped that when the head was forced lower into the pelvis, the pressure on the tumor would be so great as to occasion a discharge through the aperture of some of its contents, and thus diminish its size, and ultimately permit the labour to be terminated by the natural efforts, which were renewed every five minutes.

At three o'clock p. m. no material alteration was observed. The head of the child however had descended somewhat lower, so that the fontanelle could be felt close to the os uteri; the countenance, tongue, and pulse all gave evidence that no mischief was likely to result from longer delay, and therefore we left her till the evening.

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* Denman's Introduction to Midwifery, chap. x. sect. 7.

† Medico-Chirurgical Transactions, vol. II. p. 299.

At 10 p. m. the tumor was much altered in shape, being more diffused and softer, offering less resistance on pressure, whence we concluded that some of its contents had been evacuated, though no positive proofs of this were to be obtained. The os *tincæ* was more dilated, the head of the child nearly half uncovered and considerably lower: its motions had been distinctly felt by the mother in the course of the evening. The patient however was much exhausted, the pains were less beneficial, and altogether the symptoms indicated the improbability of the delivery being terminated, unless by artificial assistance. Still there appeared no positive necessity for immediate recourse to the perforator, and it was therefore determined to leave her for the night under the care of her midwife, upon whose judgment I could depend to send me information, if any unpleasant symptoms should arise.

February 24, at noon, she was visited again by Mr. Chevalier, Dr. Ley, Mr. Cornwall, and myself; we found her rather more spent than last night, yet she had got some sleep, which had somewhat refreshed her. The tumor was rather more diminished, but the head of the child was not at all advanced. As she had passed no urine, the catheter was introduced, aud about half a pint was drawn off.

As it was manifest that more delay would only add to the hazard of the case, it was now determined to use the perforator, and if possible finish the delivery. The perforation was easily effected, but the unyielding state of the os uteri prevented for the present the extraction of the head; this was therefore obliged to be delayed for several hours, till greater dilatability in this part should take place, and the bones of the cranium should be more easily separable. At the end of six hours Dr. Ley accompanied me to the patient's residence, when we succeeded in breaking down and extracting with our fingers, the parietal bones, and in about two hours brought the child into the world.

For some time before the head was extracted, the tumor had ceased to be felt, and after delivery it was not to be discovered; it was probable, therefore, that it had become more emptied, and had finally ascended above the brim of the pelvis, as the uterus had contracted.

The child was moderately large, the head much ossified, and the forehead turned towards the pubes.

Mrs. Cobb had a tedious and difficult recovery, if indeed it could be termed a recovery. For many weeks she was confined to her room, afterwards she was just able to crawl about by the help of a stick, but felt almost continual pain and uneasiness in the loins; she was much constipated, the abdomen became tumefied, and frequently was extremely tense. For these several complaints various modes of relief were tried with transient benefit; had her condition of life allowed of using more expensive means of cure, it is probable that more good would have been done, but she was in extreme poverty, and though many charitable persons contributed to make her situation as comfortable as possible, yet of course much was necessarily left undone.

In the summer she went into the country, where, I am informed, more decided evidences of ascites shewed themselves, but by the exhibition of some powerful diuretics these symptoms were removed. After an interval of several months she returned to town greatly emaciated, and worn down by daily exacerbations of hectic fever, which at length released her from her sufferings about eighteen months after her delivery.

On examination after death marks of chronic inflammation of the abdomen were every where apparent. The ovarium, situated nearly in its proper position, was, together with the neighbouring parts, agglutinated into a mass of disease:

when removed, the ovarium itself was about the size of a small lemon, and contained a granulated sebaceous kind of matter; there was no hair in it, nor osseous substance, except a single piece of bone, apparently a tooth, which was lying loose among the sebaceous matter, unattached to any other part; the other ovarium was healthy; the pelvis was well formed, and could have opposed no material obstacle to the birth.

This case resembles a good deal that which occurred to Dr. John Ford, as related by Dr. Denman, in which the tumor was punctured through the vagina, and the child was expelled alive by the natural efforts. "This patient recovered from her lying-in, but some time after becoming hectic, she died at the end of about six months, though from the symptoms it did not appear that the fever was occasioned either by the disease or the operation. This patient was not examined after death*."

It is, perhaps, to be regretted in Mrs. Cobb's

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[*] Thus is this case stated by Dr. Denman, who says he received the history from Dr. Ford himself. I have in my possession a MS. copy of the lectures of Drs. Osborn and Clarke, taken in 1789, in which a different account is given, on what authority does not appear. It says, "*the tumor was punctured and the child was born safe; the woman died of a fever which came on,* and after death the rectum was found punctured. The puncture was made with scissors; had a proper instrument been used, probably that would not have happened."

case, when the contents of the tumor were found to be so thick as not to be discharged through the puncture, that we did not proceed to make a more free incision, but we were cautious of being too bold in performing an operation hitherto but little known; and as it did not seem impossible to deliver by lessening the head, we thought that the method pursued was on the whole the most judicious and proper.

CASE III.

March 21, 1816, Mrs. Barnes, midwife to the parish of St. George, Hanover Square, sent for me to Mrs. Breechford, a poor woman, who had been many hours in labour of her third child. In this case there was a tumor lying below the projection of the sacrum, but not occupying much of its concavity; it was neither so large, so much circumscribed, nor so incompressible as in the other instances that I had witnessed. The pains were acting very powerfully, and I observed that as the head of the child was forced down, the tumor yielded and became flattened against the back of the pelvis. I determined therefore to try whether I could not by my fingers raise it above the brim of the pelvis, and introducing my hand I succeeded with very little difficulty in removing it, and thus procured room for the head to pass, which in less than an hour was protruded through the os externum. The child was alive and healthy.

This patient had a good recovery and still continues well, not having been pregnant since. I should not have thought this tumor ovarian, but from the possibility of raising it above the brim of the pelvis, which could hardly have been accomplished, except with an encysted tumor.

CASE IV.

The following case was communicated to me by my very ingenious friend, Mr. Alfred Hardwick, of Epsom, who was called to inspect the body after death, and who very obligingly sent me the parts for a preparation.

Mrs. Shorter, having been in pain at intervals since Saturday, June 7th, 1817, became so much worse on Wednesday the 11th, as to send for her accoucheur, who found the os uteri fully dilated, and the head resting upon the pubes; he discovered also a considerable and firm tumor pressed into the vagina, which appeared to be situated between it and the rectum, as a finger passed into each embraced a large portion of it; her pains were regular though not strong. Next day no material alteration being perceived, a consultation was requested. The gentleman consulted, considering the tumor of a compressible nature, thought that by keeping it back, should strong pains come on, the child might probably be protruded by the natural efforts, and therefore advised to wait.

Friday, 13th. She had some sleep towards morning, her strength and spirits good, but her stomach was sick; she took diluting nourishment, and had at her own request a little ale. In the evening the sickness went off; the pains were less frequent through the day; her pulse was good, and she was free from restlessness.

Saturday, 14th. She had enjoyed comfortable sleeps, had taken and continued to take plenty of nourishment, and her pains were much stronger; under these circumstances sanguine hopes were entertained of a happy termination of the labour.

At half past five in the evening, upon examination, the head was found to be removed, and the part presenting to be the right shoulder. The pulse was diminished in force; it was now agreed in consultation to turn the child by bringing down the feet. The delivery of the body of the child was shortly accomplished, but the operator was foiled in repeated attempts to bring away the head, though he employed the blunt hook and crotchet; at length however it was accomplished by means of the last instrument. Unfortunately most alarming symptoms took place immediately after delivery; before the placenta could be extracted deglutition became obstructed, syncope came on, and death closed the scene in less than half an hour.

The body was opened twenty-four hours after death. The bladder was enormously distended, containing several pints of urine, and from its flaccid state had probably lost all contractile power previous to dissolution. The uterus had but partially contracted; it was brought forwards with a view of examining the posterior surface; the whole fundus was dark-coloured and gorged with blood. On cutting through the reflection of the peritonæum which passes from the rectum, the knife accidentally wounded the tumor, and some of its contents escaped. The tumor was situated between the cervix uteri and the rectum, forming a cushion in the hollow of the sacrum, the superior portion rising an inch or more above the projecting part of that bone; its shape was elliptical, flattened at the anterior and posterior surfaces by the pressure it had suffered; its size was that of a large orange, or the head of a fœtus at six months; it was contained in a cyst, apparently formed of the peritoneal reflection at its superior part and of the cellular membrane, connecting the rectum and vagina. *It was not ovarian;* the ovaria being still visible, of their proper size and in their natural situation, with regard to the uterus. From its bulk the rectum was nearly surrounded by it, and the anterior portion of the rectum was inseparably connected to the tumor; the whole mass was soft and compressible, and although the cyst was in most parts very thin, it had not given way by the force employed in the delivery.

The contents of the tumor were regularly disposed in layers, the concave surface of one portion being exactly adapted to the convex surface of the next, and the diameter of each about the breadth of a sixpence; their colour resembled tallow, and they appeared to consist of adipocerous matter.

There was nothing else observed upon dissection that requires to be mentioned.

This woman was about forty-four years of age at the time of her death. She had been delivered of six children. In her first and sixth labours the forceps were used, but no tumor existed at the time of her former labour (the sixth) in 1812, "at least none that could be detected by the finger in a common examination."

The alteration in the position of the child, viz. its conversion from a head to a shoulder presentation, induced the accoucheurs to bring down the feet, a practice which in some similar cases has been unsuccessfully adopted. M. Baudelocque and Professor Van Doeveren, as I have already remarked*, attempted turning, but in both cases the mothers and children were lost. My friend, Mr. Howship, has favoured me with an account of another fatal case, in which the child was turned; the statement he accidentally met with in looking over the MS. notes of the late Mr. Henry Watson, surgeon to the Westminster Infirmary, in the possession of Mr. Heaviside. "July 30, 1766, Dr. Mackenzie was mentioning a case, where after searching a great while for the os tincæ, they at last found it lying under the os pubis, being pushed forward instead of lying backwards towards the sacrum. The belly was very large. The woman was delivered with the greatest difficulty, for after the feet had been brought down something still prevented the head from being delivered; however at last, after great fatigue both to the operator and patient, the child was brought away, and the woman died next day.

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* Medico-Chirurgical Transactions, Vol. III.

"On examining the body, it was found that a large dropsical ovarium, falling into the pelvis behind the uterus, had turned the os tincæ into that unusual and unfavorable situation."

The operation of turning seems very ill adapted to relieve a case in which the capacity of the pelvis is so much intrenched upon, as in that where an elastic tumor fills up the hollow of the sacrum; there is however one instance mentioned by Giffard*, in which turning succeeded, though the child did not live many minutes.

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* Case 62.

CASE V.

Thursday, October 1st, 1818, by the desire of Mr. Hanbury, I visited Mrs. Daly, thirty-five years of age, in labour of her first child. Some symptoms had occurred on Sunday, September 27th, in consequence of which she had sent for Mrs. Parsons, her midwife; but the labour not proceeding satisfactorily, though the pains increased in strength and duration, Mr. Hanbury was called in on the Tuesday.

Mr. Hanbury, finding a very large tumor in the pelvis, was aware that the labour would be difficult, but the os uteri was so little affected by the pains that he did not think it necessary to do more than direct some aperient medicines, and afterwards an opiate. On Wednesday evening, the 30th, the os uteri became more open, and while he was engaged in making a more accurate examination, the membranes suddenly ruptured, and a large discharge of the liquor amnii took place; after which the strength of the pains increased, and he determined to remain with his patient all night, in hopes that the uterine efforts, now frequently recurring, might improve the condition of the labour; but he had the mortification of finding that no advantage was gained, which made him desirous of a consultation the next morning.

On examining the patient, my fingers immediately came in contact with a large elastic tumor, very much compressing the rectum, and lying so close to the symphysis pubis, that when forcibly pushed backwards it was impossible to gain a clear space of quite an inch of conjugate diameter. The os uteri was reached with difficulty, a large portion of it was undilated, nor did it feel very dilateable. The aperture of the uterus had the peculiarity of being longitudinal, for there was no space in the pelvis to allow of its assuming a circular form; the pains were frequent and severe, and during the pains the lips of the os uteri were pressed together in the direction of the back and front of the pelvis, while their longitudinal extension was considerably increased towards the ilia. Had the os uteri taken on the usual circular dilatation, it would have been about equal to the size of a half-crown.

That this tumor was ovarian, and that it contained a fluid, would not admit of a doubt; it was therefore proposed that it should be punctured, and this being consented to, Mr. Chevalier was applied to for this purpose. Passing a small sized curved trocar up the rectum, he thrust it into the tumor, and gave discharge to about six ounces of a pale yellow fluid, of the consistence of sallad oil, which was received into a bason, and a considerable quantity afterwards escaped which could not conveniently be collected.

The tumor was by this discharge so much diminished in size that we hoped the pains, which continued strong, might be sufficient to force the head through the pelvis, or at least that they would bring it within the grasp of the forceps; and our hopes were heightened in the course of the evening, by finding not only that the os uteri had assumed a circular form, and was much more dilated and softer, but that the head had descended somewhat through the superior aperture of the pelvis. The general state of the patient was likewise much improved, her tongue cleaner and moist, her skin temperate, her spirits calm, and her pulse open and not exceeding 90. We judged therefore that we were acting wisely in still leaving the case to nature.

The symptoms continued favorable till towards eight o'clock the following morning, by which time it became apparent that more assistance from art would be required; at ten the cranium was perforated, and in less than an hour the fœtus was extracted. The child was well sized, and had been dead ten or twelve hours.

The patient went on without an ill symptom till the next day, when she was found very feverish, with pain and soreness of the abdomen. Twenty ounces of blood were taken from her arm, and free evacuations were procured from the bowels; these were of a very offensive nature, and the relief which she experienced gave a good augury of her recovery.

Oct. 4. The symptoms continued favourable; she took a sufficiency of mild nourishment.

Oct. 5. She was found to be very languid, pulse quick and feeble, a little tendency to delirium. It was thought right to give her small quantities of wine and rather more generous diet. In the evening the delirium increased; she sunk rapidly, and the next morning expired.

The body was opened the next day, and the following appearances were observed.

The uterus was contracted to nearly the usual size at the same period after delivery; it exhibited no marks of inflammation or disease, except a very small tubercle on its outer surface; the left fallopian tube and ovarium were deep-coloured, and a layer of coagulable lymph was lying upon them; the right ovarium was found imbedded between the vagina and the rectum, it was about the size of a sheep's bladder, and contained fatty matter (convertible by heat into the same kind of fluid as that which was received into the bason when the tumor was punctured), a large quantity of hair, and the rudiments of two or three teeth; the punctured part was looking healthy, and the ovarium itself free from inflammation.

In the viscera of the abdomen little appearance of disease existed; there was in the pericardium rather more water than usual, but the other contents of the thorax were quite healthy; the head was opened, but nothing was therein discovered to account either for the delirium or death of the patient.

On the whole those who were present at the examination* seemed to consider the death of the patient as more attributable to exhaustion from protracted suffering, than to any organic or other mischief that could be detected by dissection.

The fluid, which on puncturing the tumor was received into a bason, after standing a short time became congealed into a solid butyraceous mass. This occurrence was new to me, I was not aware that the fatty matter sometimes discovered in the ovaria had ever been met with in a fluid state; I was therefore induced to submit this specimen to our associate, Dr. Bostock, who has so much distinguished himself by his careful analysis of various animal fluids, and he has been so obliging as to favour me with some remarks on this subject, which will form a very valuable appendix to the case.

On a review of the cases here related and referred to*, the following remarks have presented themselves.

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* Messrs. Chevalier, A. White, Pritchett, jun. Chevalier, jun. and Sweatman. Mr. Hanbury was prevented by an obstetric engagement from being present.

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* A brief enumeration of all these cases is here subjoined.

Mr. Park, in the second volume of the Medico-Chirurgical Transactions, has related six cases, five discovered during parturition, and one in the unimpregnated state.

In the first of these the perforator was used, and the mother recovered; the tumor is supposed to have burst.

The second includes the histories of several pregnancies; in the sixth labour an incision was made through the vagina; the child was then expelled by the pains, and the mother recovered with difficulty. It is not said whether the child was born alive, but it seems probable that it was.

The third was left to nature, which expelled the child, whether alive or dead is not mentioned, but the mother died.

In the fourth case the patient was not pregnant.

In the fifth case the tumor was opened, but it was afterwards necessary to use the perforator. The mother recovered, and has had a child since.

In the sixth case the tumor was opened, the child was expelled by the pains, but was dead born; the mother recovered.

In the third volume of the Transactions, the writer of this gave the case of Mrs. Ellison; she was in labour of twins, the perforator was used for one child, the other was born dead, and the mother also died.

The case of a woman at the Westminster Lying-in Hospital is also mentioned; the perforator was used, and the mother died.

Dr. Denman gives two cases, from the relation of Dr. John Ford; in the first case the perforator was used, but the mother did not survive. In the second case the tumor was opened, the child was born alive, and the mother lived six months.

M. Baudelocque turned the child, it was still born, and the mother died.

Van Doeveren likewise turned, and lost both mother and child.

In Dr. Mackenzie's case the child was turned; and both mother and child died.

Both

1. It seems evident that tumors within the pelvis obstructing delivery are of no very uncommon occurrence, and that when they have been detected, much doubt has been entertained respecting their nature and the proper method of treating them; it is then of importance that the attention of practitioners of midwifery should be directed towards this subject, in order that they may be guided by

Both mother and child died in the case communicated by Mr. Hardwick, and here likewise the child was turned.

In Gifford's case, turning succeeded in saving the mother, as is to be inferred, but the child, though born alive, soon died.

In Mrs. Franklin's case the perforator was employed, and the child extracted with extreme difficulty, the mother has never quite recovered. In a former pregnancy the child was expelled dead by the natural pains.

In Mrs. Cobb's case, though the tumor was opened, it was necessary to lessen the child, but the mother lived eighteen months.

In Breechcroft's case, the tumor was raised above the brim of the pelvis, the child was born alive, and the mother recovered.

In Mrs. Daly's case, opening the tumor, and afterwards the child's head, did not preserve her life.

Thus in eighteen instances of tumors in the pelvis, comprehending thirty-eight lives, it is seen that, of the women

6 recovered perfectly,
3 imperfectly,
9 died.

Of the children 2 were born alive,
1 was born alive but incapable of living,
15 were dead,
2 are uncertain, probably one was alive, the other not.

So that the lives actually preserved amounted to 12
Ditto not preserved - - 26

rational principles in the future management of such incidents.

2. On some occasions the medical attendants have not thought it necessary to take any immediate steps towards advancing the delivery, because the patient was not considered in immediate danger, and it was hoped that the tumor would prove sufficiently compressible to allow the child to pass when strong pains should come on. I would very unwillingly be thought the advocate of precipitation in the practice of midwifery, that rock on which the earlier accoucheurs were continually splitting; but I leave it to the judgment of my readers to determine, whether, in several of the instances enumerated, procrastination was not carried much beyond what sound discretion warranted, and the urgency of the case required.

3. I have been informed that a very eminent teacher of midwifery used in his lectures to assert, that "the idea of treating these tumors by puncturing them was very dangerous and highly improper;" and he taught, that on all occasions of this kind, the perforator should be early employed. But it may be doubted whether this opinion is tenable, for it has been proved that the force necessary to terminate the labour after the cranium has been perforated, has been so great as sometimes to cause the death of the patient, and sometimes to render her future life comfortless and dis-

tressful. In cases therefore where the tumor is found to intrench greatly upon the capacity of the pelvis, the perforator *alone* cannot be trusted to; neither does experience warrant the practice of turning and delivering by the feet.

4. I know not that the Cesarean operation has ever been applied to cases of this nature, and its constant fatality in this country would be a very great objection to employing that mode of giving relief. Yet it must be acknowledged that if the Cesarean operation had been performed upon Mrs. Daly, at the time the puncture was made into the tumor, there would have been a great probability of preserving the child, which was then vigorous and active; and the consequences to herself could not have been more calamitous than resulted from her actual labour, conducted, as we believed, with the greatest caution and judgment. Had the tumor, in this case, been incapable of diminution by puncture, no other means of effecting delivery could have been used, than the Cesarean section, and consequently under such circumstances, that operation would have been justifiable.

5. Upon the whole, the evidence we at present possess, is most in favour of opening the tumors; for of the nine women who recovered more or less perfectly, five appear to owe their safety to this operation; and of the three children born alive, or supposed to be so, two were preserved by the

same means. It may perhaps be necessary to ascertain, if possible, whether any advantage is likely to accrue from making an incision into the tumor from the vagina, rather than to puncture it through the rectum. The reasons by which we were influenced in choosing the latter, were chiefly these, first, because the *most* depending part of the tumor could be reached from the rectum, and next, because we feared that an extensive laceration of the vagina might be produced by the stretching of the parts, when the child should come in contact with the incision or aperture.

The following suggestion of Mr. Chevalier upon the subject of the after management of the tumor, is too important to be withheld. In a note which I received from him, respecting Mrs. Daly's case, he says, "I submit to you how far it might be worth while to notice a circumstance which struck me as of some importance. You will recollect, that on the examination I very easily, by my finger, dislodged the tumor from its situation between the rectum and the vagina, and returned the diseased ovarium into its place, before any dissection of the parts was attempted. Would it not in a similar case be right to attempt this when the uterus is contracted after delivery, to prevent the tumor from fixing, by any subsequent inflammation, in that unnatural situation, where it might impede a future labour, more than it could do if loose in the abdomen, or adherent to the side?"

AN ACCOUNT
OF
A SUBSTANCE
OBTAINED FROM A
DISEASED OVARIUM,
WITH SOME REMARKS ON
DISEASED SECRETIONS OF AN ANALOGOUS NATURE.

BY JOHN BOSTOCK, M.D. F.R.S. & L.S.

Read March 30, 1819.

AT one of our late meetings a paper by Dr. Merriman was read, containing an account of a tumour of the ovarium, from which was discharged by puncture an unctuous fluid, which, as it acquired the temperature of the atmosphere, assumed a solid form*. The doctor having sent me a portion of it for examination, I shall lay before the Society a detail of some of the experiments that I performed upon it; to this I shall add a few observations upon other substances of an analogous nature that I formerly examined, and I shall conclude with some remarks upon the relation which these bodies bear to each other, considered as morbid secretions, derived from the same organ in different states of action.

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* See page 71.

The substance procured by Dr. Merriman, when in its solid form, was of a brownish yellow colour, nearly without odour, and of a consistence precisely similar to that of pure lard or butter. Heat was gradually applied to a portion of it; at 65° it remained perfectly solid, at 70° it was sensibly softened, and at 80° it became completely fluid; at 160° it began to boil, and by being still further heated, it swelled up and burned, emitting an animal empyreumatic smell. When the experiment was reversed, and the substance, after being melted, was slowly cooled, it completely retained its fluidity at 80°; it then gradually became less fluid, until at 70° it was of a thick viscid consistence, and at 65° it again assumed the solid form; the processes both of melting and of solidifying seemed to be gradual, and I could not perceive that there was any exact melting point. Although the substance, while solid, appeared to be homogeneous, yet when it was melted a number of small films were perceived to be floating in it. When the heat was withdrawn, and it regained the solid form, it did not exhibit the least tendency to crystallization, or to any specific arrangement of its parts; when melted on hot water, and afterwards cooled, the under surface was found to be perfectly smooth. The tests for alkali were applied to it, both in its solid and its fluid state, but the effect upon them, if any, was extremely slight; nor could this or any other salt be detected by the appropriate tests, in water on which the substance had been kept for some time in a state of fusion, and with which it had been repeatedly agitated.

A portion of the substance was boiled with alcohol, and the fluid was filtered while hot; no visible solution had taken place, but by the addition of water a very slight turbidness was produced, and also, upon the cooling of the fluid, a minute film was perceptible upon some part of its surface. The fatty matter was heated with pure potash, when a saponaceous compound was formed, which was capable of being diffused through water, or suspended by it, so as to convert it into a uniform milky fluid; by the addition of muriatic acid the fatty substance was precipitated in the form of dense white flakes. I was not able to detect the presence of albumen in the fatty matter, by employing the usual tests for this primary compound; the effects of a high temperature seemed rather to indicate its presence, but these may be attributed to the small films which were observed in it, probably of a membranous nature, and which, I apprehend, were only accidentally mixed with it. On this point, however, I conceive that the analysis of animal substances is still imperfect, as I believe that we have no accurate method by which we can detect a small quantity of albumen when united to a large proportion of a concrete oil. I may farther remark concerning this substance, that it was very little disposed to become rancid; after being kept for four months, it shewed no disposition to putridity, nor to any kind of spontaneous change.

I have selected the above observations as what I apprehend are sufficient to enable us to form an opinion of the nature of this peculiar body, sufficiently accurate for all purposes of physiology or pathology, and from them we learn that it consists of a concrete animal oil, nearly in a state of purity, very similar to butter or lard; that it contains no alkali or other saline ingredient, and very little, if any albumen, or other primary animal compound.

The result of the above examination led me to recur to some experiments which I had formerly made upon the fluids obtained from some cases of encysted dropsy. Of one of these an account has already been laid before the Society in my paper on the nature and analysis of animal fluids*; this I shall therefore notice in a very brief manner only. Its chemical composition was considerably different from that of the fluid of dropsy in its ordinary state; the most important alteration consisted in a part of its albumen being converted into a matter exactly resembling mucus, or that substance which gives the specific character to the nasal and salivary secretion. It was doubtful whether this fluid had been collected in the ovarium, or in a cyst connected with some other of the viscera; in either case, however, in its ordinary state it would have been entirely albuminous, or would have consisted of water holding in solution a greater or less portion of albumen, with a definite quantity of the uncoagulable matter of the serum, and of the salts which exist in the blood.

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* Med. Chir. Trans. Vol. IV. p. 81.

The next fluid which I shall describe, was one, the source of which was more clearly ascertained to be from a dropsical ovarium; its properties were as follows. Shortly after it had been discharged from the body it began to separate into two parts; a white semi-fluid substance very slowly subsided, while the remainder was left nearly transparent; the fluid was poured off from the sediment, and they were each of them examined. Without descending into a minute detail of experiments, it may be sufficient to state with respect to the fluid part, that it was properly albuminous, similar to the serum of the blood, except that it contained a considerably less proportion of albumen, but with the usual quantity of uncoagulable matter and salts. The sediment, which very much resembled cream in its appearance, was then submitted to a number of experiments, the general result of which was that it consisted of minute flakes, which seemed to be similar to coagulated albumen, mixed with a proper oily matter. By agitation in water these two substances were separated from each other; a fine white flaky matter very slowly subsided, while the water was left milky, and seemed little disposed to recover its transparency. By boiling the sediment with the oxymuriate of mercury the separation of the albuminous part was more completely effected. The specific gravity of the fluid in its entire state was 1.0103; that of the sediment, carefully separated from the albuminous fluid, was 1.023; when the sediment was slowly dried it acquired a yellow colour; by still farther increasing the heat it was charred, and at length burned with a considerable burst of flame, exhaling an odour very like that of toasted cheese. The creamy sediment did not exhibit any indication of uncombined alkali by the application of the appropriate tests, but the quantity of neutral salts, especially of the muriate of soda, was considerably greater than in an equal weight of the solid contents of the serum; it differed from pus essentially in not exhibiting any distinct globular appearance.

In this case we observe a still farther departure from the ordinary condition of the parts; the secreted fluid, which naturally contains albumen, and which, in the second instance that has been referred to, had this substance converted into mucus by a kind of imperfect coagulation, here had a part of its albumen completely coagulated, together with the addition, if not of a proper oil, at least of an ingredient nearly resembling oil in its leading properties. The change was still farther advanced in the case that occurred to Dr. Merriman, where the whole, or nearly the whole, of the albumen had disappeared, and was replaced by a concrete oil, while we may perhaps be allowed to extend the series, by connecting with it those examples of ovarian tumours, which contain perfectly organized solids of various kinds, similar to those which enter into the constitution of the body.

If we may be permitted to regard the different substances mentioned above, which are the produce of the ovarium, as proceeding from the same secreting surface in different states of action, we arrive at the conclusion, that according to the nature or degree of this action the same organ may generate the common dropsical fluid, which essentially consists of albumen, a proper mucous fluid, and a perfect adipose matter, together with various shades or combinations of them. It may indeed be objected to this view of the subject, that the secretion was originally discharged in its natural condition, and was afterwards converted into mucus or fat by an interchange among its constituent particles, after it had been deposited in the sac. To this objection I should answer, that nothing resembling the conversion of albumen into a concrete oil has ever been observed in the laboratory, nor does it seem possible to be effected without the co-operation of the vital powers, that the primary constituent elements of these substances are not the same, so that it would be very difficult, if not impossible, for this change to take place in a close cavity, where nothing could be received or discharged during the process, and lastly I may remark that the saline ingredients of the substances in their altered state are not the same with those that exist in them in their ordinary form, as I found by sufficiently decisive experiments.

Perhaps the most important of all the improvements in physiology is that which was brought about by Cullen, who discarding the learned hypotheses of his predecessors, who attempted to account for the ultimate changes that were induced upon the body by chemical or mechanical agencies, substituted in their place the action of the vessels, and particularly of the capillaries of the arterial system, in which, as he correctly stated, there is every reason to suppose that the most important operations of the animal economy are carried on. The remark applies particularly to the function of secretion; here a portion of the blood, or some of its constituents, after it leaves the larger vessels, acquires a new form, having its chemical and physical properties more or less changed during its passage through the secreting arteries. This action of the vessels is to be considered as a *vital* operation, depending upon a property or properties possessed by these vessels, which belongs to living organized matter alone; yet as the result of the operation is to induce a physical change in the substances subjected to its action, it becomes a legitimate object of inquiry what is the nature of the change by which the process is effected, or by what means does the action of a vessel produce a change in the nature of its contents? The following will suggest themselves as among the most obvious: 1. the relative proportion in which the constituents of the blood enter the vessel; 2. the nature of the blood with respect to its arterial or venous state; 3. the rapidity with which the fluid is propelled through the vessel; 4. the degree of compression or agitation which it experiences during its passage; and 5. the situation in which it is deposited after it leaves the vessel, whether it be in a close cavity or exposed to the atmosphere, or to any other agent, or whether it be so placed that a portion of it is subject to be taken up by absorption as rapidly as it is discharged.

Although it is probable that we may never be able to disclose many of the mysterious operations which produce the ultimate changes of the body, we may remark, that by a proper combination of the above circumstances, we are in possession of a number of agencies which are adequate to the production of a great variety of results. At the time when the blood is undergoing that change in the lungs, by which it is converted from its venous into its arterial state, a quantity of carbonic acid is expired; we may therefore presume that venous contains more carbon than arterial blood, and it may consequently be conjectured that if there be two vessels in all respects similar, except that in one of them the blood is in a more arterialized state, the fluids secreted from it will contain a smaller proportion of carbon, or approach more to the nature of oily or adipose substances. There are several circumstances which lead us to conjecture that some of the constituents of the blood are more perfectly fluid, or in a state of more complete solution than others; for example, that the salts are the most soluble, the uncoagulable matter probably the next so, afterwards comes the albumen, and last of all the fibrine. Now, upon mere mechanical principles, but which will apply to all fluids passing through tubes of any description, we must admit that the salts will find their way through the most minute of these passages, while the fibrine, on the contrary, will be the most easily obstructed; and this agrees with what we actually observe to occur with respect to the secreted fluid.

Without going farther into detail, it will, I conceive, be admitted that the other circumstances which were pointed out may, in the same manner, apply to the case of the fluid passing through the capillaries, and will influence the nature of the results. The next point is for us to examine whether we have any grounds for applying these data to the principles of pathology, whether we can form any opinion respecting the condition of the vessels from the substances proceeding from them. The investigation is confessedly obscure, and what I can offer will be almost entirely conjectural; but if conjectures be offered with diffidence, and not obtruded as established positions, they may assist in pointing out the path to important truths.

In the case of a surface, which in its healthy state secretes an albuminous fluid, we find this fluid to contain the same saline ingredients with the blood, and the same quantity of uncoagulable matter, a variable portion of albumen, but always less than that in the serum, while the fibrine is totally absent. Here then the action of the capillaries is simply to separate from the blood a part of its albumen, and the whole of its fibrine, a change, which we easily suppose is effected, merely by the fluid passing through a tube of a certain size and with a certain rapidity, so that the more completely soluble parts alone are suffered to pass, while those that are less soluble are detained.

Let us now suppose that by some cause the capillaries have their action so far altered that their size is increased, that their contraction is more powerful, and that the temperature of the organ is raised. We might conceive, under these circumstances, which may be considered as constituting a certain stage of inflammation, that the albumen will be discharged in great quantity, and may also be partially coagulated, thus forming a mucous secretion, while we may conjecture, that in a higher degree of the inflammatory state, where the arteries are more distended and act with more force, and where at the same time the temperature is still further increased, a larger proportion of albumen will be discharged in a more coagulated form, together perhaps with a quantity of fibrine, thus producing the various kinds of exudations which are occasionally observed under these circumstances.

I think it unnecessary to pursue these speculations to any greater length, for I must be understood as offering them rather as illustrating the way in which we may hereafter throw some light upon pathology by the researches of animal chemistry, than as supposing that we have any actual proof that the operations to which I have now alluded really exist. The Society will, I conceive, agree with me, that if it were possible to ascertain the exact condition of the action of the capillaries in their various morbid states, by means of the nature of the fluids elaborated by them, we might hope in this way, not only to obtain a valuable indication in the means of cure, but that we might perhaps resolve many curious problems respecting the operations of the animal economy, which are at present quite incomprehensible.

OBSERVATIONS
ON
THE CHANGES
WHICH
THE ANIMAL BODY UNDERGOES
IN A
HOT CLIMATE SOON AFTER DEATH.

BY JOHN DAVY, M.D. F.R.S.

COMMUNICATED IN A LETTER TO SIR JAMES MACGRIGOR.

Read Feb. 2, 1819.

Kandy, Ceylon, June 14*th*, 1818.

MY DEAR SIR,

SINCE I had the pleasure of addressing you last, I have collected in the prosecution of my professional duties, some observations on the changes which the animal body in a hot climate undergoes soon after death, and prior to putrefaction, to which I should be happy to call the attention of medical men.

Immediately after death, before the body has lost its heat and flexibility, the heart and arteries, as well as veins, are full of blood which is fluid as in life, and every part may be considered nearly in the same state that it was in before the fatal event took place.

But if several hours be allowed to elapse before the examination of the body is made, for instance, from twelve to sixteen hours, new appearances will present themselves. Little blood will be found in the great arteries; coagulated blood or polypi will be found in the auricles of the heart; the viscera will appear more or less turgid with blood, especially the lungs and the lower part of the viscera; the peritoneal covering of the gall-bladder, and the adjacent parts of the liver and intestines, will have assumed a dark-greenish hue; and lastly, should there be much bile in the intestines, the intestines in general and peritoneum will be discoloured and rendered of a light green.

Farther, if the interval between the death and the examination of the body be still greater, as from twenty to thirty hours, still greater changes will have taken place. The serous and mucous membranes in general will appear red and inflamed, and especially those parts which are most exposed to the action of blood, as the valves and the lining membrane of the heart and bloodvessels; any serum that may be effused into the ventricles of the brain, between the pleuræ or in the pericardium, will be more or less tinged with blood; the viscera will appear dark and livid, and the skin along the track of the great vessels streaked of different hues from extravasated blood.

These changes which I have described generally, I have observed in a variety of different instances. Most of them are familiar appearances in morbid anatomy.

It is a well known fact that the blood soon after death, I believe before it has time to coagulate, partially forsakes the great vessels and accumulates in the viscera, particularly in the lungs, liver and spleen; and it may perhaps be accounted for, by means of the slow coagulation of the blood after death, and on the principles of gravitation, capillary attraction, and the relaxation of the animal fibre.

It is also, I believe, a well known fact, that bile immediately after death begins to penetrate the substance of the gall-bladder, exude and stain the contiguous parts; and its exuding from the intestines, when it is abundant in them, is only what might be expected considering the similarity of parts. The phenomenon in both instances may be explained, perhaps, without much difficulty, by referring it to the relaxed state of the membranes and their affinity for the colouring matter of bile, with which, judging from the durability of the stain, they appear to combine chemically.

The appearances of inflammation, in consequence of the exudation of bloody serum, are the only phenomena which I have described that have any pretensions to novelty; they seem to admit of an easy explanation. Bloody serum appears just as capable of penetrating relaxed membranes as bile; and, like bile, the colouring matter of blood appears to be attracted, and to combine with dead animal substances, and especially the white textures of the body; as is easily illustrated by the simple experiment of immersing a piece of white membrane in blood, or, what is better, blood and water, for twenty-four hours, when it will have acquired a red and inflamed appearance, that cannot be removed by simple washing, nor indeed entirely by maceration in water for several hours.

The false appearances of inflammation in consequence of the absorption of the colouring matter of the blood are phenomena, I conceive, not unworthy of the attention of medical men, both in relation to pathological anatomy and medical jurisprudence. These false appearances are in many instances so exactly like the true, that I doubt if the most experienced anatomist would be able to distinguish between them. I have made the trial with medical friends, by asking their opinion of parts that had been coloured by immersion in blood, and, without the least hesitation, they have pronounced the parts strongly inflamed; I have even in some instances remarked an apparent increased vascularity, bloody serum having entered the minute vessels, which during life conveyed only colourless lymph; and I am acquainted with several cases in which I believe inflammatory appearances the effects of exudation, were considered by medical men as phenomena of genuine inflammation that had taken place during life; indeed it was the consideration of such cases that first drew my attention to the subject.

I may observe farther, that these *post-vital* changes (if I may be allowed the expression) take place with different degrees of rapidity, according to circumstances, and more especially according to the state of the solids and fluids and the temperature of the atmosphere; generally speaking, the warmer the air is, and the greater is the tendency of the body to putrefaction, so much the sooner and the more decidedly will it exhibit the phenomena in question.

To conclude, I may express my conviction, founded on what I have seen, that in the majority of cases no minute examination of the dead body is of any value if more than six hours, in a hot climate, are allowed to elapse between the fatal event and the dissection. And certainly in many instances the time that has elapsed should be accurately noted.

I have the honour to be,
My dear Sir,
Your very obedient humble servant,
J. DAVY

Sir James Macgrigor, M.D.
Director-General, &c. &c.

ON THE OPERATION FOR ANEURISM.

BY GEORGE NORMAN, ESQ. OF BATH.

COMMUNICATED

BY MR. ASTLEY COOPER.

Read Feb. 16, 1819.

AS a difference of opinion has existed among surgeons on the subject of the operation for Aneurism, some recommending the application of two ligatures, and the division of the artery between them, others proposing the single ligature as practised by Mr. Hunter, varying however the mode of its application, conformably to the views of the operation of the ligature on arteries, presented to them by the experiments of Dr. Jones and others, I take the liberty of offering to the Society a few instances in which the latter method has been employed; considering it to be desirable that every evidence should be collected on a subject of so much importance in the practice of surgery; and hoping also that some other circumstances in the cases may be of sufficient consequence to render them not altogether unacceptable to the Society.

—— Hicks, aged 50, who had been twenty years a coachman, was admitted into the Casualty Hospital September 7th, 1813, for an aneurism of the femoral artery, immediately below Poupart's ligament.

He had always enjoyed good health, but about a year ago he was attacked with giddiness of the head. He applied to Dr. Barlow, who had prescribed bleeding and purgative medicine, which soon cured him. He continued perfectly well until ten days before his admission into the hospital, when he had been suddenly seized with a severe pain in the upper part of the right thigh, extending down the inner side to the leg. He then first discovered a tumor about the size of a pigeon's egg, in the upper part of the thigh, which he observed to beat very much. He could not remember having used any exertion previous to these circumstances.

The pain became more violent, and the swelling increased so much, that on the following day he was unable to get out of his bed. He was bled, and in three days the bleeding was repeated, but the tumor rapidly enlarged.

In nine days from its first appearance, he was admitted into the hospital, having been brought a distance of fifty miles.

The tumor commenced at the lower edge of Poupart's ligament. It extended four inches downward, and measured seven inches in width. The man thought it had acquired this size in three days after its first appearance. The pulsation was not very distinct. The skin over the tumor was hot and red, and the pulse 108, hard and full. He was bled, and a solution of acetate of lead applied to the swelling. He was confined to bed, and by the 13th his pulse was reduced to 76. The skin over the tumor was less inflamed, but the size of the tumor remained the same, and the leg was swollen and œdematous.

On the 13th, the operation of securing the external iliac artery was performed, by making a longitudinal incision, in the manner recommended by Mr. Abernethy. A single ligature was passed round the artery, and it being ascertained that the vessel was no more detached from the surrounding parts than the ligature had separated it, was tied, and the parts brought together.

Seven hours after the operation the limb felt equally warm with the other; his face was flushed;

his pulse 96, and hard; his breathing quick and laborious. Sixteen ounces of blood were taken from the arm.

On the 14th, he was free from pain; his breathing natural, pulse 90, and soft. The heat of both limbs was ascertained by the thermometer to be the same.

On the 15th, he complained of great pain in the tumor, which was hot and very red; his pulse 110 and hard; his breathing frequent, and his skin hot. Sixteen ounces of blood were again taken from his arm, and a cold lotion applied to the tumor.

On the 16th, he was better and free from pain; the redness of the tumor was diminished; pulse 96 and soft.

17th. The tumor was less; the redness of the integuments had disappeared; the wound had united at every point, except that where the ligature was.

He went on well, the tumor gradually diminishing until the 25th, when its size was somewhat increased; the skin over it was hot and red, and pressure on it gave pain. Cold lotion was again applied, some purgative medicine given, and his diet was reduced for a few days. The pain and redness again subsided, but an evident pulsation could be felt in the tumor.

October 1st, the ligature came away; after this the swelling rapidly diminished, but a weak pulsation could be distinctly felt in it, which however gradually ceased, and he was discharged from the hospital November 1st, when the tumor was reduced to one fourth its original size, and the limb had nearly recovered its original strength.

I have had several opportunities of seeing this man since. The swelling soon entirely disappeared and the limb became as strong as the other. He has two or three times been affected with giddiness of the head, which has been always cured by bleeding; but for the last twelve months he has had no return of illness whatever, and was on Sept. 25th, 1818, when I last saw him, in perfect health.

This aneurism appears to have arisen from plethora; and judging from the sudden appearance and rapid increase of the tumor to its full size, in three days, it seems probable that it was a rupture of the femoral artery, and that the tumor was occasioned by the extravasation of blood into the surrounding parts.

Twice after the operation he was threatened with serious inflammation of the aneurismal tumor, which probably, had it not been subdued by bleeding, would have prevented the success of the operation. And in a few days after the operation, when the collateral circulation in the limb was fully established, the tumor was again supplied with blood in sufficient quantity to produce a distinct pulsation, a fact of practical importance, as it shews, that though the ligature on the iliac artery stops the direct influx of blood into the tumor, and is the means by which the disease is cured, yet that there exists a necessity for employing strict rest, the antiphlogistic regimen, and in some cases the abstraction of blood, to assist nature in her operation of obliterating the aneurism.

Joseph Gerrish, aged 50, a tailor by trade, applied at the Casualty Hospital, April 1st, 1817, in consequence of violent pain and swelling of the right leg.

He was so lame that it was with the utmost difficulty he had walked to the hospital. His countenance was exceedingly anxious, he was much emaciated, his pulse very quick and weak. He said the swelling of the leg had begun a fortnight before, but a few days ago he had experienced great pain in his thigh, and soon after the leg began to swell he had discovered a tumor in the upper and inner side of the thigh.

The tumor, on examination, proved to be an aneurism of the femoral artery, immediately at its passage under Poupart's ligament; the tumor was four inches in length, and three in breadth; it commenced at the upper part of Poupart's ligament; the pulsation was strong, and at the most prominent part a thrilling sensation was given to the finger, and at the same part the skin was hot and red. He had never, he said, made any very violent exertion. He had been for several years an invalid, having been affected for some winters with cough. He was ordered to keep cloths wet with cold lotion constantly applied to the swellings, and to keep his bed.

The three first days after his admission somewhat improved his situation; his pulse became slower and stronger, his countenance indicated less distress, and the redness of the skin on the tumor subsided.

On the 5th of April he complained of violent pain in the limb; the tumor had much increased since the evening before; it extended above Poupart's ligament to nearly opposite the superior spinous process of the ilium, and a pulsation could be plainly felt at its upper part.

The operation was proposed to him, but he could not be prevailed on to submit to it before the following day.

The operation was performed by making the incision in the direction of Poupart's ligament, as proposed by Mr. Astley Cooper, which I found to be a much more easy method of finding the external iliac artery, than the longitudinal incision practised by Mr. Abernethy, and which in the former case I had made use of.

And it appears to me that the objection made to Mr. Cooper's mode of operating in cases where the tumor extends high up, is by no means well founded, for the lower part of the bag of the peritoneum, lying on the edge of Poupart's ligament, must in every case be exposed and detached, in order to get at the artery which lies behind the posterior part of that membrane, and this is most readily effected by an incision in the direction of Poupart's ligament, whilst two thirds of the longitudinal incision are made on a part of the peritoneum which lines the abdominal muscles, and the lower portion only of the incision reaches that part of the membrane which is to be separated.

The consequences of this are, that the peritoneum is in much greater danger of being wounded, and that the probability of a hernia forming after the cure is much increased by the extensive division of the oblique muscles.

One ligature was passed under the artery, and tied as in the former case, the artery not being in the least disturbed. After the operation, tension of the abdomen and retention of urine supervened. The wound sloughed, and after twelve days of varying degrees of suffering he died.

In the evening he was free from pain; pulse 108, but weak; the limb felt equally warm with the other.

On the 7th, he was free from pain, and had slept well; pulse 120, and small; the abdomen was tense, but not painful on pressure; the swelling of the leg was much diminished.

On the 8th, his pulse was 128, his tongue furred; he was in no pain. The abdomen was still tense. He had passed no urine since the middle of the day preceding; a pint of water was drawn off by the catheter, but the tension of the abdomen was not diminished; the wound had not united; there was a brownish red appearance of inflammation round it; the swelling of the limb was much less, and the aneurismal tumor was less tense and was reduced in size. He took nourishment freely, and decoction of bark with laudanum.

On the 9th, he was much the same; pulse 120, and intermittent; the abdomen still tense; it was again necessary to pass the catheter.

On the 10th, there was less intermission of the pulse, and the abdomen was less tense; he had passed some urine, but a pint was again drawn off; the whole surface of the wound was in a sloughing state; and the discolouration round it more extended.

On the 11th, he was better; his pulse 96 and less intermittent; he had passed sufficient urine.

12th. He was better than the day before; the slough on the wound was separating, and the discolouration was less; the tumor was reduced in size.

13th. He had passed a good night, and said he was better, but his countenance looked more sunk. A large slough had formed above the wound since the day before; he suffered no pain, and the tension of the abdomen was gone.

On the 14th, he still said he was better, but looked much worse; pulse 108 and intermitted; he could take very little nourishment.

On the 15th and 16th he got gradually worse, and on the 17th, being the twelfth day after the operation, he died.

On examining the body, the fascia covering the abdominal muscles of the side on which the operation had been performed, was in a state of slough to the same extent; that the erysipelatous inflammation had appeared on the skin, and on opening the abdomen, the corresponding portion of peritoneum was of a dark purple. The peritoneal covering of the iliacus internus of that side was of the same colour, and was distended by the pressure of the aneurismal tumour, part of which was situated in that muscle, and extended as high as its origin from the spine of the ilium.

The cæcum was of a dark colour, and adhered slightly to the peritoneum; there were red patches on the external coat of the aorta at the bifurcation, and on both the common iliacs.

The left external iliac was not larger than the right, which had been tied; the right iliac was of a purple colour, and contained a red coagulum, which extended from the ligature to the internal iliac.

On removing part of the coagulum, the internal coat of the artery was seen of a dark red; the ligature was under the artery, which was no where detached; there was no appearance of suppuration except at the point where the ligature was applied; there the vein adhered firmly to the artery.

The artery below the ligature was filled with a clot of blood to the extent of an inch, where the arteria circumflexa ilii was given off, and a little below that was the origin of the epigastric.

A little lower than that vessel the crural artery was dilated for the space of two inches, to the width of an inch and a half, whilst the crural vein adhered firmly to its inner side; the arteria profunda was given off from the lower extremity of the dilated part of the artery, and below that the femoral artery was of its natural size and appearance.

The aneurismal tumor was situated behind the dilated part of the artery; the lower part of it was formed by the pectinalis muscle, and the upper by the iliacus internus.

On opening the tumor more than a pint of blood, part fluid and part coagulated, was removed; some firm coagula adhered to the sides of the sac, and one solid clot closed the opening from the artery into this cavity; on removing this it appeared that the internal and middle coats of the artery had been destroyed, and that the elastic coat dilated, formed the inner surface of the sac for about two inches, when its appearance was gradually lost in the muscular structure of the tumor.

There were some adhesions of the pleura on the right side of the chest, which contained from seven to eight ounces of opaque serum. There was no disease of the lungs, and no fluid in the cavity of the left pleura. The pericardium contained five ounces of serum, and there were some large flakes of coagulated lymph on the surface of the pericardium covering the heart; there was not any disease of the heart, of its valves, or of the large vessels.

This appears to have been a case of diffused aneurism, from ulceration of a portion of the artery, and it seems probable that no tumor existed till the blood had escaped into the muscles.

Two circumstances of practical importance are evinced in this case; one is the necessity of operating as soon as the nature of the disease has been ascertained, as every hour adds to the risk of the blood being forced into the surrounding parts to a greater extent than admits of reparation after the artery has been secured, and which occurred in this case after the patient was admitted into the hospital, and seems to be one reason of its unsuccessful issue;

though perhaps the disease of the right pleura and of the pericardium were sufficient to prevent the powers of the constitution from being successfully exerted for the cure.

The other is that in some cases of aneurism the operation may be performed though the tumor may extend higher up than where it is necessary to pass the ligature round the artery, provided it has been clearly ascertained that the disease commenced below; for in this case the tumor, at the time of the operation, extended as high as the bifurcation of the aorta.

The dissection shews, that the process for the obliteration of the artery and the separation of the ligature was going on satisfactorily, and that had the patient lived, the single ligature would have answered as well as in the former case.

John Lacey, a boy not quite fourteen years of age, was admitted into the Casualty Hospital on the evening of the 28th of August, 1817. The account that I received of him was, that one month before, he had been wounded by another boy, who had forced a hay-fork into the upper and outer part of his left thigh. He bled so profusely at the time, as to induce his friends to believe that he would bleed to death, before the surgeon to whom they sent (and who lived at the distance of more than half a mile) could arrive.

The hemorrhage, when he came, had however ceased. He dressed the wound, and applied the tourniquet loosely, with directions to the friends how to tighten it if the bleeding returned.

Blood was discharged at the wound for two days after, but not in sufficient quantity to excite alarm. On the third day it again burst out, and subsided, which induced the surgeon to have the boy removed to the town where he himself resided, that he might be near in case of sudden hemorrhage, and that he might have the assistance of another surgeon.

The bleeding returned two or three times, but not in such a degree at any one time, as to induce the surgeons to think it necessary to make any attempt to secure the vessel. At length all hemorrhage ceased for ten or fifteen days, and the wound appeared to be going on well.

But on the evening of the 27th, exactly one month after the accident, a more profuse bleeding than any of the former occurred, and though it again ceased, the quantity of blood lost was so great, and the boy was so much reduced, that the surgeons thought it right on the following morning to endeavour to secure the artery.

An incision was accordingly begun a little above the wound, and carried through it, down the outer part of the thigh, to the extent of seven inches. After dividing the fascia to nearly the same extent, several clots of blood were removed, which left a cavity situated in the muscles of the upper part of the thigh, from the bottom of which an immense flow of blood issued as soon as all the coagula were removed, but the wounded vessel could no where be discovered.

A tourniquet was applied at the highest part of the thigh, and the patient, accompanied by one of the surgeon's assistants, was brought to the hospital at Bath, a distance of eight or nine miles.

I saw him soon after his arrival; he was much emaciated and very pale; his pulse small and very quick; both feet were cold, the wounded limb was of an icy coldness, and the leg œdematous.

On removing the tourniquet and bandage, the blood began to flow freely, but pressure on the artery in the groin commanded the hemorrhage. The opening in the outer part of the thigh was large enough to admit the whole hand. The wound made by the hayfork was a little below the trochanter, but all trace of the direction in which the instrument had passed, was lost in the immense cavity formed among the muscles by the extravasated blood. The finger, when passed into the upper part of the cavity, reached the spot where my assistant compressed the artery in the groin.

Under these circumstances, I was unwilling to hazard any attempt to find the wounded artery, more especially as the very reduced state the boy was in, rendered it certain that he could not survive any farther loss of blood, and as the passing of the finger to Poupart's ligament rendered it possible that the wound of the artery was high up. I therefore, whilst the assistant's thumb compressed the vessel, made an incision in the direction of the upper edge of Poupart's ligament, and passed a single ligature round the external iliac artery.

After tying the ligature, I found that though the violence of the hemorrhage was restrained, yet that a larger quantity of blood continued to flow from the wound in the thigh than was consistent with the boy's safety.

I therefore exposed the femoral artery two inches below Poupart's ligament, and finding that when I held the artery between my finger and thumb all bleeding ceased, I tied a single ligature round the artery.

About four ounces of blood were lost during the whole time. The boy was now faint, his hands and feet cold, no pulse could be felt at the wrist, and he breathed very faintly. After swallowing some warm wine he recovered a little, the pulse at the wrist returned, and he spoke, but there was no farther hemorrhage. All the coagulated blood was removed from the cavity of the thigh, the parts brought as near together with adhesive plaister as could be affected, the boy placed in bed with the limb wrapped in flannel, and thirty drops of tinct. opii. given to him in some warm wine.

He slept well in the night, and on the 29th he appeared tolerably well; he was pale, his pulse small, 140 in a minute. The whole limb was warm and less swollen; he said he did not feel pressure made on the foot, but in the upper part of the leg and the knee sensation was perfect.

In the evening the limb was quite warm, and the feeling of the foot restored; he complained of fulness, and there was some tension of the abdomen.

He continued to improve gradually until September 5th, when there came on a very large discharge of matter, mixed with blood, from the wound in the thigh, which arose from a large collection of coagulated blood in the lower part of the thigh finding its way into the wound.

On the 6th, he appeared better, the limb, which had been more swollen for two days, was less. The discharge from the wound was diminished; pulse 130.

On the 7th, he had been attacked with a violent diarrhœa; the discharge from the wound was increased; the ligature on the femoral artery came away.

On the 8th, the diarrhœa continued; he had passed a restless night; the foot of the affected limb was cold, and had dark patches on it; pulse 144.

9th. He had vomited frequently; pulse 150; there were vesications on the foot; the leg was warm, but much swollen.

10th. The vomiting had ceased, and he appeared rather better; pulse 134; the vesications on the foot increased.

11th. He slept almost the whole day; his countenance much sunk; pulse 138; the whole foot was dead.

12th. He was delirious; pulse very small; countenance more sunk.

13th. Delirium still continues; pulse at the wrist scarcely to be felt.

14th. He had taken some nourishment; pulse fuller, and his countenance a little improved; the integuments for four inches up the leg were dead, and there was a large sphacelated patch on the inner side of the leg.

15th. He was rather better; pulse 108; he got some sleep, and the delirium had subsided.

16th. He was still better; pulse 108; the wounds in the thigh looked better; a line of separation had formed between the foot and the living part of the leg.

17th. The ligature from the external iliac artery came away.

19th. His countenance and pulse had improved; the foot was separating from the leg.

In the three next days his general health farther improved; the foot was almost separated from the leg; the sphacelated parts in the leg were much separated, but a large patch of slough had appeared on the inner side of the knee.

On the 25th, the bones of the tarsus were nearly detached from the tibia; the sphacelated part of the leg had separated, so as to expose two thirds of the fibula; large sloughs had formed over the sacrum, and the posterior spinal process of the *ilium* was exposed; pulse 108.

26th. He appeared better; he had slept well; his appetite was pretty good. The limb was amputated above the knee; the femoral artery, and two others nearly as large (one immediately below the femoral, and the other under the bone) required to be taken up. The boy bore the operation well, and was not sunk by it.

On the 27th, he had slept nearly all night; he was free from pain; pulse 124; his countenance was much improved, and he had taken a considerable quantity of nourishment.

By the 30th he was much improved; the stump was opened; it had united, except at one point, whence some matter issued from a sinus in the thigh.

October 3d. The stump had made considerable progress; the wounds in the thigh were nearly healed; the sloughs on the back had separated, and left large healthy sores.

12th. All the ligatures had come away from the stump, which was healed except a small opening, communicating with the sinuses in the thigh; the sores on the back were much less; pulse 98; he sat up part of the day, for the first time.

November 8th. He was so far recovered that he sat up the whole day. The sores on his back were reduced to an inconsiderable size; the stump and the wounds in the thigh were nearly well.

By the end of November all the sores were well, and his health exceedingly improved. He shortly after returned to his home.

It appears to me, that the hemorrhage which occurred after the ligature was placed on the external iliac artery, arose from the blood carried into the femoral artery by the epigastric and circumflexa ilii: that the second ligature was placed below those arteries, and that the wound in the femoral artery was below the second ligature; for had the wound in this vessel been situated between the two ligatures, there seems to be no reason why the blood from the epigastric and circumflex arteries should not have flowed into the wound, even more readily than before, from its passage through the femoral artery being stopped by the lower ligature.

The quantity of blood which these arteries supplied, shews how essential their anastomosis with the internal mammary, and with the branches of the internal iliac, is to the continuance of the circulation in the limb, when the external iliac has been tied.

To the loss of this assistance I attribute the failure of the circulation in this case, though as the foot retained its heat for some days, there is some reason to believe that the circulation would have been permanently re-established had not the diarrhœa, which unfortunately occurred, produced so great a prostration of strength in a subject already so much reduced by frequent hemorrhage, as to leave scarcely any hope of his recovery.

The success of this case after the amputation, teaches the surgeon not to decline an operation in the most extreme case, where inevitable death awaits the patient if it be neglected.

Aaron Henton, aged thirty-six, a bargeman, was admitted into the Casualty Hospital, October 7th, 1817, with an aneurism in the right ham. He said that about a week before he was suddenly seized with a pain in the right ham, and the next day perceived a small swelling, which in the space of one hour became nearly as large as a man's fist, which was about the size of the tumor at the time of his admission. It was not circumscribed, but its appearance was gradually lost in the surrounding parts; the limb was much swollen, and he walked with great difficulty; pressure on the tumor diminished its size about one half, when the femoral artery was compressed in the groin. The man's countenance bore marks of exceeding distress and anxiety; he had not slept for three nights; he was bled, and cloths wet with a saturnine lotion applied to the leg and tumor.

On the following day the swelling of the leg was somewhat diminished, but the man had not slept.

A single ligature was passed under the femoral artery, in the middle of the thigh, by means of a blunted crooked needle, without separating the vessel from any of the surrounding parts. After the ligature was tied there was no pulsation in the ham.

On the 9th, he had slept nearly all night; the swelling of the limb was gone; the leg and foot were warm, and the veins of the leg full; the tumor was rather diminished, but there was an obscure pulsation in it.

Three days after, on the 12th, he was going on well; the tumor was diminished, but a pulsation could still be felt in it; cloths wet with a cold lotion were applied to the ham.

19th. He was going on well, but the tumor was not much lessened; there was still a pulsation in it, but less evident than when it was last examined. The wound in the thigh had not united by the first intention, but was granulating kindly.

23d. Fifteenth day. The ligature came away; it was then doubtful if any pulsation could be felt in the tumor, but its size was not diminished. Pressure was made on the swelling, by means of a compress of linen, and a bandage kept constantly wet with a cold lotion.

Nov. 8th. The tumor was considerably diminished; the wound in the thigh was well, and the man's health much improved. The pressure was continued for some time; the tumor gradually disappeared, but was not sufficiently reduced for him to leave the house till December 22d, when the swelling which remained was hardly the size of a walnut.

It seems probable, from the rapid increase of the aneurism after its first appearance, that the popliteal artery suddenly gave way, and that the blood was effused into the surrounding parts.

The tumor was sufficiently supplied with blood the day after the operation for a distinct pulsation to be felt, which continued for many days after; shewing that though a ligature on a distant part of the artery stops the immediate current of blood into the tumor, yet that when the collateral circulation becomes established, the aneurism partakes of it, and that in some cases farther assistance is necessary to repair the evil. For I much doubt if in this case the disease would have been cured by the ligature on the femoral artery, had not the obliteration of the aneurism been assisted by a continued and pretty powerful pressure.

This man was again admitted into the hospital, May 29th, 1818, with an aneurism of the left popliteal artery; it was of the size of an egg, and perfectly circumscribed.

The man said he had discovered it about a week before; that it then had a pulsation, and that it had gradually increased. The leg was not much swollen; his countenance more sunk, and very sallow; his health much worse than when he left the hospital.

The femoral artery was tied with a single ligature, in the same manner as that of the other side, on the 6th of June.

The pulsation of the tumor ceased, and could never afterwards be felt. The swelling rapidly decreased, but the man's health was very slow in recovering.

On the 31st of August, he left the house, at which time there was no appearance of the tumor in the ham last operated on, and a hard tumor only the size of a hazle-nut in the ham of the right side;

his health was then much better. I saw this man November 14th, when his health was completely restored.

In the second operation in this case the ligature was of catgut, and the ends were cut off close after it was tied. Part of the wound appeared to have united by the first intention, but matter afterwards formed, and it was a considerable time before the ulcer healed. The ligature was never seen to come away, but from the circumstance of the suppuration I should apprehend it must have done so.

John Morgan, aged thirty-eight, a pauper resident in the poor-house of Walcot parish, in consequence of complete deafness, shewed me on the 5th of March, 1818, a pulsating tumor in the right ham, the size of a small orange, which he said he first discovered three days before, and that it had rapidly increased to the size it then was. His pulse was hard and full; he was bled, and a cold lotion applied to the tumor.

March 7th. A single ligature was passed under the femoral artery, as in the last case; the ligature was catgut, and the ends were cut off.

On the following day, there was no pulsation in the tumor. The man was going on well. When the wound in the thigh was opened, it appeared to have united, but in two days separated. A long and troublesome suppuration ensued, and the wound was not healed till the latter end of April; the ligature was never seen to come away.

In these two cases the ingenious proposal of Mr. Lawrence, to procure a permanent adhesion of the parts over a ligature, did not succeed, for the wounds were longer getting well than in the ordinary way; and in some amputations, in which I have tried the plan, I have been equally unsuccessful; for though union by the first intention appeared to have taken place, yet one, two or more small sinuses have formed, and continued open many weeks, through which some of the ligatures were seen to come away in one instance, six months after the operation.

The tumor in the ham was very slow in being absorbed, and I applied pressure, after some time, by means of a wet compress and bandage. In this case the pulsation was never renewed after the operation. The man has continued well since.

In all these cases a single ligature only was employed, and in every instance it came away satisfactorily, without any suppuration or sinus in the course of the artery, and without the occurrence of secondary hemorrhage.

I have also, in two cases of wounds of the brachial artery (in situations where it was impossible to get at the wounded vessel, without dividing the muscles of the arm) tied the artery higher up with a single ligature.

In both instances the cure was completed by making pressure on the part of the artery which had been wounded, with a wet compress and bandage, and in both cases the ligatures answered perfectly.

In addition to these cases I have, in more than twenty instances, tied the carotid arteries in sheep for Dr. Parry, in experiments made by him on the arteries of living animals, and in no instance did secondary hemorrhage occur.

I am aware that the analogy between the arteries of animals and men may not be correct.

I once detached the carotid artery of a sheep completely from the surrounding parts, for the space of four inches, and tied one ligature in the centre of the detached portion, expecting that secondary hemorrhage would ensue, from sloughing of the artery, but that case did as well as any of the others, a result that would scarcely have occurred in the human subject.

But. I consider that the success of these cases goes a considerable way in proving that secondary hemorrhage is not more likely to ensue where one ligature is used; and I am inclined to believe, that if the artery be not removed from its situation, or more detached than the ligature separates it, that hemorrhage is less likely to occur than in the ordinary way of applying two ligatures, and dividing the artery between them; and certainly a greater portion of the wound may be expected to unite by the first intention over one ligature than over two, and the risk of sinuses forming in the course of the artery must be materially lessened.

The only case of secondary hemorrhage which has occurred to me after the operation for aneurism, was one of the popliteal artery, in the year 1807, when the femoral artery was tied with two ligatures, and divided between them. The upper ligature came away on the thirteenth day after the operation, the lower one on the fifteenth, and the day after a profuse hemorrhage came on, and the patient lost above a pound of blood. Pressure, with a compress and wet bandage, was continued for some time, and the wound healed.

It may be worth remarking, that in a short time after, an aneurism formed in the opposite ham, and in a few days acquired the size of a small walnut. I advised the patient to go into the country where he resided, and to return in about a month, for the second operation to be performed.

He returned in two months, when the tumor had become solid, and had lost all pulsation. It was soon after entirely absorbed.

I saw this man last year, in perfect health, ten years after the cure of the aneurism. A proof that the formation of aneurism, even in two arteries, may happen, without any farther defect of the arterial system.

December 4th, 1818.

ON

URINARY

AND OTHER

MORBID CONCRETIONS.

BY WILLIAM HENRY, M.D. F.R.S. &c.

Read March 2, 1819.

THE analysis of urinary concretions is a subject of chemical research, which has already been investigated with so much ability and success, that it can never be expected to supply little more than a few scattered facts, that may have escaped the industry of former inquirers. My experiments, indeed, were for the most part made more than twelve years ago; and such of the results, as have not already appeared in an Inaugural Dissertation on the Uric Acid; printed in 1807, were reserved, as I there intimated, for a larger work on Stone and Gravel, which, at that time, I had it in view to undertake. This, if other impediments had not occurred to its execution, is now completely superseded by an excellent " Essay on the Chemical History and Medical Treatment of Urinary Calculi," lately published by Dr. Marcet. One effect of the delayed fulfilment of my purpose has been, that I have been anticipated by other writers, as to several of the facts that had occurred to me. Some of these, however, it may still be proper to state in general terms, as they furnish additional evidence on points that have been the subjects of differences of opinion.

The urinary concretions from the bladder, which I have examined experimentally, amount in all to 187. Of these, 34 were extracted by the late Mr. Ingham, of Newcastle upon Tyne; 35 by the late Mr. White, of Manchester; 25 by Mr. Hey, of Leeds; 23, partly by the late Mr. Gibson, and partly by Mr. Ainsworth, both of this town; and the remaining 70 have been given to me by surgical practitioners in this place*, and in various parts of the kingdom, with the obliging view of facilitating my inquiries. The number of the different varieties of calculi in these several collections is stated in the following Table, which exhibits them in a sort of natural order, differing from the chemical arrangement, which I have proposed in another place, and which I still prefer for most of the purposes of classification.

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* Especially by most of the late and present surgeons of the Manchester Infirmary: and to Mr. Ransome, one of the surgeons of that charity, I am indebted for dividing the calculi by a saw, without which division, collections of urinary concretions can afford no useful information.

TABLE I.

Shewing the Number of each Variety of Calculus in several different Collections.

						ALTERNATING CALCULI.				
	Chiefly Uric Acid.	Earthy Phosphates.	Oxalate of Lime.	Compound.	Cystic Oxide.	Uric Ac. and Phosph.	Oxal. and Phosph.	Oxal. and Uric Ac.	Oxal. Ur. Ac & Phos.	Total.
Mr. Ingham's	15	1	0	1	0	7	3	3	4	34
Mr. White's....................	19	7	3	0	0	3	2	1	0	35
Mr. Hey's	9	4	2	0	0	7	2	0	1	25
Mr. Ainsworth's	7	2	2	1	0	6	2	1	2	23
Own Collection	21	8	1	6	2	16	7	6	0	70
	71	22	11	8	2	39	16	11	7	187

From the preceding Table, I have calculated the following, exhibiting the proportion which each kind of concretion bears to the whole number in the different collections. For example, in Mr. Ingham's collection, the calculi consisting chiefly of uric acid are to the whole number as one to one and two tenths; in Mr. White's, as one to one and eight tenths, the second decimal figure being omitted throughout as unnecessarily minute.

TABLE II.

Shewing the Proportion of each Variety of Calculus to the whole Number in the different Collections.

Kind of Calculus.	INGHAM. Newcastle.	WHITE. Manchester.	HEY. Leeds.	AINSWORTH. Manchester.	OWN.	Whole Number.
Chiefly Uric Acid..................	1 to 2.2	1 to 1.8	1 to 2.7	1 to 3.3	1 to 3.2	1 to 2.6
Earthy Phosphates..................	1 to 34.	1 to 5.	1 to 6.	1 to 11.5	1 to 8.8	1 to 8.5
Oxalate of Lime..................	....	1 to 11.6	1 to 12	1 to 11.5	1 to 17.7	1 to 17.
Compound..........................	1 to 31.	....	....	1 to 23.	1 to 11.8	1 to 23 5
Alternating..........................	1 to 2.	1 to 3.2	1 to 2.4	1 to 2.2	1 to 2.4	1 to 2.5
Alternating. Uric Acid and Phosphates	1 to 4.8	1 to 11.6	1 to 3.4	1 to 3.8	1 to 4.4	1 to 4.8
Oxalate and Phosphates ...	1 to 11.2	1 to 17.5	1 to 12	1 to 11.5	1 to 10.1	1 to 11.6
Oxalate and Uric Acid......	1 to 11.2	1 to 35.	....	1 to 23.	1 to 11.8	1 to 17.
Uric Acid Oxalate and Phosphates	1 to 8.5	....	1 to 21	1 to 11.5	....	1 to 26.5
Cystic Oxide........................	....	....	....	....	....	1 to 98.5

The greater proportion of uric acid calculi in Mr. White's collection, than in that of Mr. Gibson and Mr. Ainsworth, may, on first view, appear extraordinary, as those three gentlemen all practised surgery in the same town. It will be found, however, in the joint collection of the two latter, to be compensated by a much greater number of that variety of alternating calculus, which is composed of uric acid and the phosphates in distinct layers. It may be remarked, also, that the greater number of Mr. White's operations were performed at a very remote period of time, when little interruption was given to the natural progress of the disease by the use of alkaline medicines, and that his patients were chiefly from a distance. Of late years, in consequence of the increase of public hospitals in the adjoining counties, cases requiring lithotomy occur comparatively very seldom at the Manchester Infirmary; and the town, and district immediately surrounding it, may be considered as remarkably unproductive of stone patients, though cases of gravel occur, so far as I have the means of judging, as frequently as in other remote districts*.

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* It is a well ascertained fact, and one which should give encouragement to persons labouring under gravel, that this disease occurs very frequently without degenerating into stone; and that it is even endemic in districts where the stone is a very rare disease. See Beverwyk de Calculo, p. 78. Carleton de Lithiasi, p. 118. and Heberden Comment. p. 78.

In the collection of Mr. Ingham, of Newcastle, the proportion of calculi composed entirely of the earthy phosphates is unusually small, but is compensated by the number of concretions in which the phosphates alternate with uric acid. On the whole, indeed, there is a remarkable uniformity in the composition of calculi generated in districts very remote from each other, a fact which proves that the causes rendering the stone endemic in certain countries act, not as was once imagined in supplying directly the material of which the concretions are composed, but in inducing a constitutional tendency to the disease.

It was the opinion of some of the older writers, that all calculous concretions (with the exception of such as are formed on extraneous substances accidentally introduced into the bladder) do in fact originate in the kidnies, and descending through the ureters, merely acquire an increase in the bladder by attracting solid matter from the urine. To this opinion, which Fernelius especially has ably supported*, it has been objected that stone in the bladder is in many instances not preceded by any pain in the region of the kidnies, or by the symptoms that denote the descent of a stone through the ureter†. It is perfectly conceivable, however, that a small calculus may find its way from the kidnies to the bladder, without exciting pain in its passage. The opinion of Fernelius and of others who agree with him, I find also to be confirmed by the appearance of almost all the calculi which I have ever examined, after having been divided by the saw; for, except in very few instances, a central nucleus may be distinctly seen, sufficiently small to have descended to the bladder through one of the ureters, even when that passage has not been dilated beyond its natural diameter. The stone therefore is to be considered, essentially and in its origin, as a disease of the kidnies. Its increase in the bladder may be occasioned either by exposure to urine containing an excess of the same ingredient as that composing the nucleus, in which case it will be of uniform composition throughout; or if the substance composing the nucleus should, either by a spontaneous change in the action of the kidnies, or by the effect of medicines, be secreted in less than natural proportion, the concretion will then, like any other extraneous body lodged in the bladder, acquire a covering of the earthy phosphates.

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* Fernelii Opera, p. 317, folio.

† Beverwyk de Calculo, p. 69.

Under this view of the subject, it becomes highly important to ascertain of what ingredient the nuclei of urinary calculi are, for the most part, constituted, since it is in the tendency of the kidney to generate this ingredient, that the primary cause of the disease must consist. Of the 187 calculi which I have examined, 17 have been formed round nuclei composed chiefly of oxalate of lime; 3 round nuclei of cystic oxide; 4 round nuclei of the earthy phosphates; 2 round extraneous substances; and in three, the place of the nucleus is supplied by a small cavity, occasioned probably by the shrinking of some animal matter, round which the ingredients of the fusible calculus had been deposited*. The remainder, amounting to 158, have a central nucleus composed chiefly of uric acid. It appears then that in a very great majority of cases, the disposition to secrete an excess of uric acid has been the essential cause of the formation of stone; and it becomes important to inquire what are the circumstances that contribute to its excessive production, and by what plan of diet and medicine the tendency to its too great secretion by the kidnies may best be counteracted or removed. This inquiry, however, is not within the scope of the present essay, which is limited to the chemical composition of the concretions when actually formed.

Of Uric Acid Concretions.

It has never yet occurred to me to examine a calculus composed of this acid in a state of absolute purity. Of the concretions which I have classed under this head, a considerable number, after the action of pure potash, have left an insoluble residue of the earthy phosphates; and from the solution of those even, which have entirely dissolved in that menstruum, I have in no case been able to recover by the addition of acids, a quantity of uric acid equivalent to the weight of the calculus dissolved. The utmost that I have ever obtained has been 92 parts from 100 of an uric concretion. On this subject, therefore, my experience entirely agrees with that of Mr. Brande*. The loss doubtless arises from the decomposition of animal matter by the alkali. This, as I have stated in my Thesis, is partly urea, which, I found, may be separated by digesting the powdered calculus in alcohol, and evaporating the solution†. It is not, however, to urea that the colour of uric acid calculi is to be ascribed, but rather to the other substances which in urine generally accompany it; for it has been shewn, by Professor Berzelius and by Dr. Prout, that pure urea is destitute of colour. In one instance only I have observed a vesical calculus composed chiefly of uric acid, to be of the whiteness of chalk; and from this the action of alcohol did not extract any portion of urea. Gelatine I have never been able to discover, by applying its appropriate test to water which had been digested in the powdered calculus; but the presence of albuminous matter appears to me to be indicated by light flocculi, which sometimes float over the uric acid, when precipitated by acids from its solution in alkali. It is probable, however, that the characteristic ingredient of urinary calculi does not necessarily require a cement to bind it together, but that the aggregative attraction of its particles is sufficient to unite them into a compact mass. All curative plans, therefore, which have in view the removal of a cementing ingredient (the mode in which Haller and Hartley explained the action of alkaline solvents) appear to me to be without probable grounds of success.

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* Rau has shewn, by a direct experiment, that pus may form the nucleus of an urinary concretion. See Denys de Calculo Renum, &c. p. 14.

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* Phil. Trans. 1808. † Dissert. Inaug. 1807, p. 39.

Urate of ammonia, I believe with Mr. Brande, has been erroneously set down by Fourcroy and Vauquelin as an ingredient of urinary calculi. At least, I have never found any indications of its presence in calculi which had been previously subjected to the successive action of alcohol and of acetic acid; menstrua, which would remove urea and the ammoniaco-magnesian phosphate, but would not, in the quantities employed, have separated urate of ammonia.

Several opportunities have been thrown in my way of examining urinary calculi, extracted from persons who had been long under a course of caustic alkaline lixivia. In one of these (No. 13. of Mr. Ingham's collection) the outer surface of the calculus might, on first view, have been supposed to have been eroded: but a closer examination satisfied me that the appearance was owing, not to the solution of the uric acid, of which the concretion chiefly consists, but to an irregular deposit of the earthy phosphates, occasioned probably by the medicine. Another calculus in the same collection (No. 15.) taken from a person who had long been using Perry's solvent, was so brittle, that on attempting to divide it by the saw, it separated into concentric coats, composed of uric acid with a large proportion of the earthy phosphates. The third is a fusible calculus, now in my possession, of remarkable whiteness and compactness, and containing no appreciable portion of uric acid. In a fourth instance, a calculus, put into my hands by Dr. Brown, of Glasgow, which had been taken from a person after so free an use of alkaline medicines as to have injured his general health, consisted chiefly of the triple phosphate of ammonia and magnesia. It was so brittle that it broke almost into powder under the forceps, and was therefore extracted by the scoop. These cases, and others of the same kind, which I think it unnecessary to mention, tend to discourage all attempts to dissolve a stone supposed to consist of uric acid, after it has attained considerable size in the bladder; all that can be effected under such circumstances, by alkaline medicines, appears, as Mr. Brande has remarked*, to be the precipitating upon it a coating of the earthy phosphates from the urine, a sort of concretion which, as has been observed by various practical writers, increases much more rapidly than that consisting of uric acid only. The same unfavourable inference may be drawn also from the dissections of those persons, in whom a stone has been supposed to be dissolved by alkaline medicines; for in these instances it has been found either encysted or placed out of the reach of the sound by an enlargement of the prostate gland. The former source of fallacy was shewn to have existed even in one of the cases which procured to Mrs. Stevens the parliamentary reward of £5000*; and examples of the latter kind have been related by Dr. Heberden and Sir Everard Home.

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* Philosophical Transactions, 1808.

Two instances have fallen within my knowledge, in which persons have voided quantities of uric acid with the urine, far exceeding any thing that I can find upon record. In the first, which was mentioned to me by Professor Memo, of Edinburgh, every pint of the urine voided by a man about forty years of age, who laboured under symptoms of gravel, deposited about two ounces of a brick-coloured sediment, which I found on examination to be chiefly uric acid with a very small relative proportion of the earthy phosphates. In another instance, a lady of middle age, who was subject to gravel, was in the habit, when warned of its approach by the usual symptoms, of having recourse to a medicine, the composition of which is kept secret, but which appears to me to be nothing more than spirit of turpentine coloured by a little petroleum, with the addition of a portion of tincture of opium. The uniform effect of this medicine was the discharge of a sandy substance in such quantity, that more than four ounces were sometimes voided within the space of two or three days. It was composed chiefly of uric acid, with a small proportion of urea and of the earthy phosphates. I have since known another instance in which the same medicine has produced a similar effect, though not to an equal extent, probably by acting as a stimulant to the kidnies; and clearing them, by the increased flow of urine which it excites, of the sand that had been deposited in the tubuli uriniferi and pelves of those organs.

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* Newman's Inquiry into the Merits of Solvents, London, 1781.

Calculi composed chiefly of the Earthy Phosphates.

The pure phosphate of lime, or bone earth calculus, I have not been able to recognize in any of the collections of calculi which I have examined, though assisted by a recollection sufficiently distinct of one which was shewn to me some years ago by Dr. Wollaston; nor have I ever found the triple phosphate of ammonia and magnesia composing, in a pure state, an entire calculus, though in Mr. White's collection there is one containing more than 90 per cent. of that salt. From this proportion I have found it in a variety of others, down to 20 and even 10 per cent. With phosphate of lime, in proportions which seem to have a considerable range, it constitutes the fusible calculus, and this mixture forms the principal ingredient of calculi that have concreted round foreign substances. A calculus in Mr. White's collection, the nucleus of which is a bougie that had slipped into the bladder, is composed of

Phosphate of lime . . .	20
Ammoniaco-magn. phosph.	60
Uric acid	10
Animal matter	10
	100

In four instances only out of 187, the calculus has been composed throughout of the earthy phosphates; and in these I have not been able to discover a nucleus of any other substance. I consider the fact therefore as sufficiently established, that in some instances, though comparatively very few, a tendency to secrete the earthy phosphates in excess is a cause of the formation of stone, first probably in the kidnies, and subsequently in the bladder. This tendency, indeed, as is well known, sometimes manifests itself by the discharge of urinary gravel, consisting of the triple phosphate either alone or in conjunction with phosphate of lime, Several years ago, the Rev. Mr. R. of Cheadle, in Staffordshire, consulted me respecting a train of very distressing symptoms, some of which evidently denoted considerable disease in the kidnies. His urine, which at some times was perfectly limpid, was at others loaded with a white substance, which gave it when first voided the opacity of milk. On standing, a copious deposit took place, a portion of which was sent to me for examination. It was perfectly white, and so impalpable as to resemble a chemical precipitate. On analysis, it proved to consist of nearly equal parts of the triple phosphate and phosphate of lime. The discharge of this powder was always preceded by violent attacks of sickness and vomiting, and its quantity was invariably increased whenever he took soda water or any other alkaline medicine. Beside the affection of the kidnies, there appeared to me to exist important disease of the chylopoietic viscera, and to this I ascribe his death, which took place a few months afterwards. In this case, it was remarkable that the weight of the body was reduced from 183 to 100 pounds at rather an early stage of the disease, without a corresponding degree of muscular emaciation, owing, obviously, to the imperfect nutrition of the bones, in consequence of the waste of the phosphate of lime through the urinary passages.

Mulberry Calculus.

In calculi of this description I have always found, with Dr. Wollaston and Mr. Brande, an admixture of other substances with the oxalate of lime, which is to be considered as their characteristic ingredient. One of the best marked specimens I have ever seen of the rough kind afforded, from 10 grains, 5.3 grains of carbonate of lime, equivalent to nearly 6.6 of oxalate, 1 gr. of uric acid, 0.3 gr. of phosphate of lime, and a quantity of dark-coloured flocculi of animal matter, which did not descend along with the uric acid, when the latter was precipitated from its alkaline solution. These flocculi were soluble again in pure potash, but not in alcohol or in dilute acids. The colouring ingredient of this variety of calculus is communicated both to caustic alkalis and to concentrated muriatic acid, the latter of which becomes tinged like a strong infusion of roasted coffee. On diluting the solution, part of the oxalate of lime is deposited, but the colouring matter remains dissolved. It is probably derived originally from effused blood, for the smooth variety of calculus which consists chiefly of oxalate of lime, is not distinguished by this dark shade of colour.

Cystic Oxide Calculi.

By means of Dr. Wollaston's clear description of this rare variety of calculus, I have recognised two specimens of it in my own collection, but with the histories of both I am wholly unacquainted. They have obviously been extracted from the bladder; the one when entire weighing 660 grains, and the other 334. In each, the nucleus is the same substance as the rest of the concretion; and in a third specimen, also in my possession, a very small spherule of cystic oxide forms the nucleus of a moderately sized calculus, the rest of which consists of uric acid. This oxide appears, therefore, as Dr. Marcet has properly remarked, to be in reality the production of the kidnies, and not, as its name would import, to originate in the bladder.

Calculi, the Ingredients of which are disposed in alternate Layers.

Of these I have little more to observe than will be suggested by inspecting the first Table; viz. that calculi composed of layers of uric acid and the earthy phosphates are, in the collections which I have examined, the most frequent variety of the alternating kind; next follow those of oxalate of lime and the phosphates; then concretions of oxalate of lime alternating with uric acid; and lastly, those occur most seldom in which the three substances just mentioned alternate together. I have not met with an instance of a calculus containing four ingredients in distinct layers; and it appears, from the testimony of others, that such examples are extremely uncommon.

Foreign Substances voided in the Urine.

I have related in a periodical medical journal[*], the case of an elderly gentleman, who discharged in his urine the larvæ of an insect, which when first voided were alive and vivacious, and so far as could be made out by an eminent naturalist, belonged to some species of the coleopterous order. In this case, though the patient would not consent to be sounded, there was doubtless a stone in the bladder, and, as appeared to me, extensive disease of the bladder itself and of the prostate gland; but no examination I believe was made after his death, which was occasioned suddenly by a fit of apoplexy.

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[*] Edin. Med. Journ. vii. 147.

I have lately been made acquainted, by a gentleman of middle age, with a singular discharge which he frequently observes in his urine, of a considerable number of short hairs. Besides that he is above all suspicion of being deceived himself, or deceiving others, I have satisfied myself, by the most careful investigation, that they have their origin from the inner surface of the bladder, or from some of the urinary passages. They are of various lengths, from $\frac{1}{10}$ of an inch to an inch, and now come away without giving him any uneasiness, though he has at times suffered pain from the discharge of gravel of the uric acid kind. On one occasion the hairs which were voided had acquired, before their discharge, a distinct coating of uric acid. The symptoms having at one time excited suspicion of a stricture of the urethra, a bougie was twice introduced without giving him pain; nor was its use followed by any increase of the number of hairs that were voided, which might perhaps have been expected, if they had grown from the membrane of the urethra*.

Of Morbid Concretions from other Parts of the Body.

PULMONARY CONCRETIONS. A pulmonary calculus, expectorated several years ago by a patient of the late Dr. Ferriar, was found to be chiefly composed of phosphate of lime, with a very minute proportion of carbonate. Such also has been the composition of other specimens, given to me by Dr. Baron, of Gloucester; but a remarkably large one in the possession of Mr. Ainsworth, which weighed when entire 51 grains, and exhibited a complete cast of one of the bronchial cells, is principally composed of the triple phosphate, with a very small relative proportion of phosphate of lime, and a mere trace of carbonate. Some concretions taken from the lungs by the late Mr. Allan Burns, of Glasgow, have their earthy part composed of about one fifth of the triple phosphate, and four fifths of phosphate of lime, with a minute proportion of the carbonate of that earth. The subject, from whom these concretions were taken after death, I was informed by Mr. Burns, was a female about fifteen years old, who, though affected with violent cough, had never expectorated any calculous matter. The spine in this case was so much incurvated that, towards the close of life, the face approached nearer to a horizontal than to a perpendicular line. The substance of the lungs when grasped was felt to be full of hard knots, from the size of a pea to that of a hazel nut; and a concretion, about the size of a large musket-ball, was found firmly impacted in the left branch of the trachea, near to its origin. By a careful examination of the concretions in the substance of the lungs, Mr. Burns ascertained that each was lodged in a bronchial cell, and was enveloped in a distinct capsule, which admitted of being readily separated from the membrane of the air cell. Indeed in all concretions discovered in the soft parts of the body, Mr. Burns informed me that he has uniformly found a peculiar substance containing the solid substance, and over this another sheath of dense membrane. The inner covering he supposed to belong essentially to the concretion; and the outer one to be formed in consequence of the irritation caused by the presence of an extraneous body.

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* When examined chemically these fibres do not appear to differ from common hair; but it has been observed by Dr. Wollaston, that they differ in some respects in their mechanical texture, since they have not that slight roughness in one direction of the surface on which the *felting* property of common hair of every kind depends. This property of hair is most distinctly shewn by pressing it between the fingers, and at the same time sliding the fingers upon each other in the direction of the hair, which will by this motion be seen to travel forward with its root foremost. The finger which moves *from* the root slides freely along the hair, while the other finger is prevented from sliding in the opposite direction by a degree of roughness (which is thus sensible though not in any way visible) but in its turn this finger also will move from the root while the hair now rests against the opposite finger. It has also been remarked by Dr. Wollaston, that common hairs are not really tubular, as has often been asserted, but that these fibres really are so.

CALCULI FROM THE SPLEEN. For the opportunity of examining these, I was indebted to the same zealous and able anatomist. They were of small size, shaped like a pear, of a yellowish white colour, and were composed of bone earth, without any portion of the triple phosphate.

SMALL CRYSTALS FORMED ON THE SURFACE OF A CANCEROUS PREPARATION, KEPT IN SPIRIT OF TURPENTINE. These also, I received from Mr. Burns; and though not strictly belonging to the class of morbid concretions, I mention them here, on account of their singular composition. They are in very minute parallelopipedons, are fusible when placed on a piece of iron heated below redness, and evaporate in an aromatic smoke. They are very sparingly soluble in water, but more so in alcohol; and the latter solution, when concentrated, reddens litmus paper. They agree therefore in their properties with the camphoric acid, and furnish an instance of the production of that acid under circumstances not before observed. Whether they had passed through the intermediate state of camphor, which, by well known treatment, may be obtained from spirit of turpentine, it is now impossible to ascertain. Mr. Burns, however, assured me that they may not unfrequently be seen on preparations kept in that fluid; but never, except when the parts have been imperfectly dried before being immersed in it. It is probable, therefore, that they may be found under similar circumstances in other anatomical collections.

Manchester, Dec. 16, 1818.

HISTORY OF

A CASE

OF

NEPHRITIS CALCULOSA,

IN WHICH

THE VARIOUS PERIODS AND SYMPTOMS OF THE
DISEASE ARE STRIKINGLY ILLUSTRATED,

AND

AN ACCOUNT OF THE OPERATION OF LITHOTOMY,

GIVEN BY THE PATIENT HIMSELF.

By ALEX. MARCET, M.D. F.R.S.
ONE OF THE VICE-PRESIDENTS OF THIS SOCIETY.

Read May 11, 1819.

THE subject of this remarkable case is a gentleman about forty years of age, who, to the advantages of a liberal education, unites an uncommon share of cheerfulness, and a firmness of mind which does not forsake him under the most trying circumstances. His habits are those of great activity, and he has long filled public situations of considerable labour and responsibility.

In the retrospective view of the circumstances of his illness, with which he has himself furnished me, he divides it into four periods. During the first, which he traces as far back as the year 1801, while otherwise in perfect health, he began to discharge calculous matter, which, however, occasioned at first but little pain, and none of the sensations in the region of the kidneys which became afterwards a source of so much suffering. This calcareous discharge consisted in a white chalky substance, generally passed immediately after voiding his urine, and enveloped in a quantity of thick mucus. In the course of 1802, however, this discharge became almost constant; some irritation was produced at the neck of the bladder and in the urethra, a troublesome chordee occurred, and the mucus frequently came away slightly tinged with blood. The calculous substance was at this time discharged in the form of a pretty stiff paste, which hardened on standing, and crumbled between the fingers into a white powder, in which sparkling crystalline particles could be discerned.

At this period the patient was about twenty-three years of age, of a tall and robust structure, and exceedingly fond of bodily exercises, in some of which he excelled in a remarkable degree. His general health was perfectly good.

The second period seems to have been connected with a change in his mode of life. Towards the end of 1803, his habits became extremely sedentary, and in 1804, he became subject to violent paroxysms of pain in the lumbar region, which were immediately attended by violent retchings, and more or less obstinate constipation. Under these circumstances cathartics were instantly rejected; but it often happened that a dose of laudanum sufficiently allayed the pain to enable him to retain the cathartic; and whenever a passage through the bowels was obtained, the nephritic symptoms were considerably relieved.

During these attacks, whether in or out of bed, it was hardly possible for the sufferer to place himself in any position which could afford him material relief. But that into which he invariably endeavoured to throw himself, by a kind of irresistible impulse, consisted in inverting his body as much as possible, which he effected by elevating his lower extremities and body along the bed-post, with his head downwards, and resting entirely upon his shoulders. During this period no calculous matter was passed.

In 1806 and 1807, these attacks became less frequent, which the patient ascribed to his duties having become less arduous, and his habits less sedentary; and in November, 1810, they ceased altogether. During the prevalence of the paroxysms, very little, if any, of the calcareous matter was passed, but there still was occasional irritation about the neck of the bladder, and he was subject to a troublesome degree of flatulence and constipation, which required the use of frequent aperients, and in particular of magnesia, from the habitual use of which he derived considerable relief. In other respects his constitution remained sound, and his strength and spirits unbroken.

Soon after the cessation of paroxysms just mentioned, our undaunted sufferer was assailed by symptoms of a still more severe description. Here begins the third period; a stone had formed in the bladder, with all the well known train of sufferings it produces. First, increased irritation at the neck of the bladder, tormenting itching and shooting pains at the extremity of the urethra, violent chordee in the night-time, a difficulty of passing his urine, which was frequently tinged with blood, &c. The patient now became incapable of riding or dancing, and even walking became very troublesome.

These symptoms gradually increased, till they arrived at the utmost pitch of severity. However familiar they are to physicians and surgeons, it will not perhaps be without interest to hear them described by the patient himself, whom, after an acquaintance and professional attendance of several years, I can state to be much more apt to underrate than to exaggerate his sufferings.

" The only position," says he, " in which I could succeed in passing my urine, was upon my knees, with my forehead placed upon the bed or sofa, and the urinal under me. All changes of posture were dreadful, especially from the erect to the recumbent position. Getting into or out of bed were the severest trials, especially the former. I have often made repeated attempts at different modes of accomplishing this object, and resolution has failed, when at length, having succeeded so far as to get into bed on my knees, with my head placed as low as possible, I have not had courage to move, till, in a state of exhaustion, I have cautiously extended one limb and gradually got upon my side. When awoke by irritation and pain, I have endured it as long as I could, rather than move; and when goaded to an effort, I usually regained the position on my knees, and after waiting the subsiding of the chordee, endeavoured to obtain relief by passing my urine. While labouring under these unpleasant effects, they were almost constantly increased by costiveness and flatulence; the use of the hip-bath, sitting over the steam of warm water in the pan of a night-table, aperient medicines and injection with an elastic gum-bottle, were the palliatives to which I had recourse."

Until then, though his own suspicions were almost amounting to a conviction that he had a stone in his bladder, yet he had never been sounded, and therefore some doubt still remained in the minds of his friends as to the precise nature of his disorder. He was advised to go to Brighton, for the purpose of using the tepid bath. The motion of the carriage during the journey produced so much pain and irritation, that he declares that, even now, he almost shudders at the recollection of the torture he endured. Still, even at this period, he had intervals of ease, during which his spirits were good, and he almost appeared to be in perfect health.

One day, while at Brighton, in December 1811, and after an unsuccessful attempt to sound him, made by a medical person, he seized upon a bougie and introduced it himself into his bladder. He then distinctly felt the bougie graze upon a hard substance, and upon withdrawing it, he found the point strewed with glittering particles of calcareous matter. Immediately on his return to London a consultation was held, in which the presence of a stone having been fully ascertained, he was advised to undergo the operation of lithotomy, upon which he instantly made up his mind; but as the introduction of the sound was followed by the discharge of a few calculous fragments, which afforded a glimpse of hope that the calculus might be entirely discharged in that way, a second consultation was held, at which it was agreed that a delay of a month would be allowed, with a view to the possibility of such a happy termination.

Those hopes, however, proved entirely groundless, and on the day before the month expired, Mr. Cline performed the operation.

However familiar all the circumstances of this severe operation are, no doubt, to most of the members of this Society, a description of the patient's sensations, drawn up by himself, cannot, I think, fail to excite some interest, and I shall make no apology for introducing it in his own words:

" My habit and constitution being good, it required little preparation of body, and my mind was made up. When all parties had arrived, I retired to my room for a minute, and bent my knee in silent adoration and submission, and returning to the surgeons, conducted them to the apartment in which the preparations had been made. The bandages, &c. being adjusted, I was prepared to receive a shock of pain of extreme violence, and so much had I over-rated it, that the first incisions did not even make me wince, although I had declared that it was not my intention to restrain such impulse, convinced that such effort of restraint could only lead to additional exhaustion. At subsequent moments, therefore, I did cry out under the pain, but was allowed to have gone through the operation with great firmness.

" The forcing up of the staff, prior to the introduction of the gorget, gave me the first real pain;

but this instantly subsided after the incision of the bladder was made, the rush of the urine appearing to relieve it, and sooth the wound.

"When the forceps was introduced, the pain was again very considerable, and every movement of the instrument, in endeavouring to find the stone, increased it. Still, however, my mind was firm and confident, and, although anxious, I was yet alive to what was going on. After several ineffectual attempts to grasp the stone, I heard the operator say, in the lowest whisper, "it is a little awkward, it lies under my hand. Give me the curved forceps:" upon which he withdrew the others. Here, I think, I asked if there was any thing wrong, or something to that purport, and was reanimated by the reply, conveyed in the kindest manner: "Be patient, sir, it will soon be over." When the other forceps was introduced, I had again to undergo the searching for the stone, and heard Mr. Cline say, "I have got it." I had probably by this time conceived that the worst was over; but when the necessary force was applied to withdraw the stone, the sensation was such as I cannot find words to describe. In addition to the positive pain, there was something most peculiar in the feel. The bladder embraced the stone as firmly as the stone was itself grasped by the forceps; it seemed as if the whole organ was about to be torn out. The duration, however, of this really trying part of the operation was short; and when the words, " now, sir, it is all over!" struck my ear, the ejaculation of " thank God! thank God!" was uttered with a fervency and fulness of heart which can only be conceived. I am quite unable to describe my feelings at the moment. The most captivating vision to the sight, the most enchanting harmony to the ear, or a combination of every thing that is calculated to delight the senses, must fall far short of the perfect blessedness of my situation. There was a feeling of release, not from the pain of the operation, for that was gone and lost sight of, but from my enemy and tormentor, with a lightness and buoyancy of spirits, elating my imagination to the belief that I was restored to perfect health as if by a miracle. Yet, with all this elation, a disposition of mind perfectly tranquil and collected, nor were my nerves in the slightest degree affected. I never heard what was the precise duration of this operation, but conceive it to have been between twelve and fifteen minutes. With respect to the pain, I am persuaded that if it were possible to concentrate what I have often suffered in one night, into the same space of time, it would have been less endurable. Indeed, this difference between the operation and one night's endurance of the stone was manifest; I have often been most distressingly reduced by the latter, but was not exhausted in the slightest degree by the former; at least my mind was firm throughout, and my body was not sensibly enfeebled. Upon the whole, should I be again similarly afflicted, I should not hesitate in again submitting to the same mode of relief, provided I could place myself in equally able hands."

The recovery from the operation was as rapid as might have been expected, from the favourable state of mind and body in which the patient was at the time he submitted to it. At the end of the second week he ceased to keep his bed; at the expiration of the third he was able to go down stairs; and at the end of the month he walked near two miles. By the end of the sixth week he was able to ride on horseback, and was in fact perfectly recovered; but the tone of the sphincter was but slowly regained, especially when walking or standing, when he found it very difficult to retain his urine.

His general health, however, was soon perfectly restored, and he began again to enjoy his usual vigour, with an uncommon flow of spirits. In this happy state he remained until about eighteen months after the operation, when he was suddenly seized with very acute pain in the region of the left kidney, which lasted for several hours, when a sharp knock at the street-door made him give a sudden start, and the pain instantly ceased. On attempting to pass his urine a moment after this, a small calculus stuck in his urethra, but was soon discharged without difficulty, and the patient was immediately restored to his usual state. In a few weeks, however, his urine became habitually tinged with blood, though, at that time, without any pain or uneasiness, and it generally looked, immediately on being discharged, like a mixture of florid blood and water; and there was no longer any appearance of dark-coloured coaguli, except in the first urine discharged in the morning. He continued nevertheless to be subject to dreadful attacks of nephritic pains, ending in the discharge of a small calculus; and one of these attacks put a sudden termination to the appearance of blood in the urine, which however returned in the course of about two months. Between the attacks of pain his recovery was complete; he was not sensible of any affection of the kidney, any farther than from an occasional sense of fulness and tenderness in that organ; and he continued perfectly free from any symptom of calculus or disease in the bladder. During the nephritic paroxysms the pain was always felt in the left kidney, except in one instance, in which the right kidney was the seat of attack, and in this case also a small calculus was discharged.

When I was first consulted on this interesting case (in 1816), I examined the calculus extracted by the operation, which proved to be of the fusible kind, as well as all the fragments since discharged. These were of a globular shape, and were therefore neither detached from a larger mass, nor secreted on the surface of the bladder, but proceeded, as the symptoms fully indicated, from the kidneys only.

I advised the patient to discontinue all alkaline remedies, and to substitute for them small doses of muriatic acid, a plan to which he readily assented, and which he continued to follow with great perseverance for the greatest part of that year. The acid, in the dose of from ten to fifteen drops, diluted in water, two or three times a day, agreed with his stomach perfectly well, and seemed to have the effect of diminishing the discharge of mucus considerably, though the habitual hemorrhage still continued*. But this did not hinder him from using all kinds of exercises without inconvenience. He had, however, a sharp nephritic attack in the following January, (1817) which terminated as usual, and for a short while suspended the hemorrhage. In April, of the same year, he experienced another nephritic attack; and in the following July he had a long and severe fever which lasted several weeks, and was supposed to have been brought on by some great exertion and mental fatigue, to which he was then exposed, being apparently quite unconnected with his calculous disorder*. On the third day of this fever, however, he observed, to his great surprise, that the hemorrhage had entirely left him, and from that time it has never returned. This fever did not only produce the beneficial change just mentioned, but it was followed by a long truce of the nephritic attacks, which (with the exception of the passage of a few small calculi which occasioned no pain) was not interrupted till towards the latter end of April last, when he again experienced a paroxysm which ended in the discharge of a small calculus, without however producing any return of his former hemorrhage. I am happy in being able to state that he is at this moment in perfect health and spirits.

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* In describing the different appearances of the blood, the patient, in one of his letters, dated March, 1819, relates the following singular occurrence. "Perceiving," says he, "several small masses of coagulated blood in the urine, and that the urine itself was not at all tinged, I poured it off to examine the blood more narrowly, when I found that these masses were coils of blood of the thickness of a stout packthread, and upon moving them about they looked very like small red worms; and as I had passed my urine about half an hour before, without observing any such appearances, I inferred that this blood must have immediately come from the kidneys, having derived its form from the ureter."

I have only to add to this long, but I hope not uninstructive narrative, that a full trial was given in this case to the muriatic acid during the year 1817, which was only interrupted by the attack of fever above related. The small calculi passed during that period, the largest of which was scarcely the size of a pea, continued to consist of phosphate of lime; but I could no longer detect any magnesia in them, and they had lost the fusible character. And it is equally remarkable, that during the year 1818, and some time after the use of the muriatic acid had been discontinued, the magnesia reappeared in the calculous fragments voided during that period.

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* During this fever, and on various other occasions, the patient was attended by Dr. Maton. He was also seen once, in consultation with me, by Dr. Baillie.

CASE

OF A

PERIODICAL AFFECTION

OF THE

EYES AND CHEST.

BY JOHN BOSTOCK, M.D. F.R.S. & L.S.

Read March 16, 1819.

THE following case, it is presumed, will not be altogether uninteresting to the Society, as affording an example of an unusual train of symptoms, and it may perhaps be considered the more worthy of their attention, from its having occurred in the person of the narrator.

J. B. æt. 46, is of a spare and rather delicate habit, but capable of considerable exertion, and has no hereditary or constitutional affection, except various stomach complaints, probably connected with, or depending upon, a tendency to gout. About the beginning or middle of June in every year the following symptoms make their appearance, with a greater or less degree of violence.

A sensation of heat and fulness is experienced in the eyes, first along the edges of the lids, and especially in the inner angles, but after some time over the whole of the ball. At the commencement the external appearance of the eye is little affected, except that there is a slight degree of redness and a discharge of tears. This state gradually increases, until the sensation becomes converted into what may be characterized as a combination of the most acute itching and smarting, accompanied with a feeling of small points striking upon or darting into the ball, at the same time that the eyes become extremely inflamed, and discharge very copiously a thick mucous fluid. This state of the eyes comes on in paroxysms, at uncertain intervals, from about the second week in June to the middle of July. The eyes are seldom quite well for the whole of this period, but the violent paroxysms never occur more than two or three times daily, lasting an hour or two each time; but with respect to their frequency and duration there is the greatest uncertainty. Generally, but not always, their invasion may be distinctly traced to some exciting cause, of which the most certain is a close moist heat, also a bright glare of light, dust or other substances touching the eyes, and any circumstance which increases the temperature. After the violent inflammation and discharge have continued for some time, the pain and redness gradually go off, but a degree of stiffness generally remains during the day.

After this state of the eyes has subsisted for a week or ten days, a general fulness is experienced in the head, and particularly about the fore part; to this succeeds irritation of the nose, producing sneezing, which occurs in fits of extreme violence, coming on at uncertain intervals. To the sneezings are added a farther sensation of tightness of the chest, and a difficulty of breathing, with a general irritation of the fauces and trachea. There is no absolute pain in any part of the chest, but a feeling of want of room to receive the air necessary for respiration, a huskiness of the voice, and an incapacity of speaking aloud for any time without inconvenience. To these local symptoms, are at length added a degree of general indisposition, a great degree of languor, an incapacity for muscular exertion, loss of appetite, emaciation, restless nights, often attended with profuse perspirations, the extremities, however, being generally cold. The pulse is permanently quickened, from 80, the average standard, to about 100, and upon any considerable exertion it rises to 120 or more.

This is an account of the complaint in its worst state, which, however, it does not assume in every season, and indeed its violence is generally less than is here described. The affection of the eyes is recollected to have occurred when the patient was eight years old, and there has been more or less of it every year since; the sneezings came on nearly at the same period, but the first attack of the chest was at the age of sixteen or seventeen. Generally speaking, the complaints have increased for the last twenty years, although not progressively. All the acute symptoms disappear about the end of July, but a considerable degree of weakness and languor is left, which remains a month or six weeks longer. It has happened that the most severe summer complaints have been experienced, after the patient had enjoyed the best health during the preceding spring. On the contrary, it has been thought that after a severe summer attack, the patient has more completely and more rapidly regained his usual state of health and strength in the autumn.

The remedies employed have been various, and they have been persevered in with an unusual degree of steadiness. Topical bleeding, purging, blisters, spare diet, bark and various other tonics, steel, opium, alterative courses of mercury, cold bathing, digitalis, and a number of topical applications to the eyes, have been very fully tried, but it is doubtful whether any distinct or permanent benefit has been derived from any of them. The complaint once seemed to be decidedly stopped by a journey, but in other instances it has existed while the patient was travelling. By using every means for obtaining fresh air, without much exertion, and by carefully avoiding a moist and close atmosphere, the symptoms may in some measure be kept off, but they have frequently appeared under circumstances that seemed the least likely to have produced them.

It may form an important addition to the narrative to state, that during the last summer the patient was so situated as to be able to avoid almost every degree of bodily exertion; he remained nearly confined to the house for about six weeks, and the result was that, notwithstanding the unusual warmth of the season, he experienced much less of the affection than he had done for several years before.

A CASE
OF
CHRONIC INFLAMMATION
OF THE
LARYNX,
IN WHICH
LARYNGOTOMY AND MERCURY
WERE SUCCESSFULLY EMPLOYED.

By MARSHALL HALL, M.D.
OF NOTTINGHAM.

COMMUNICATED BY DR. ROGET.

Read March 16, 1819.

THE profession is deeply indebted to several most respectable writers[*], for the ability with which the diseases of the Larynx have lately been pressed upon its attention. Probably the present case, which presents an example of chronic inflammation of the larynx, in which an impending suffocation was averted by the operation of laryngotomy, and the original disease was subsequently removed by the mercurial action, may be deemed of sufficient importance to form an addition to the number of valuable cases of affections of the larynx, already contained in the volumes of the Medico-Chirurgical Transactions*.

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[*] Baillie, Farre, Lawrence, Charles Bell, &c.

Mrs. Ann Hatton, aged fifty-three, of Barrow on the Soar, about fifteen miles from Nottingham, became affected in the latter end of September, 1817, with hoarseness and a hard dry cough. These two affections continued to augment in severity, without any additional symptom, during two months, when about the 13th of November, a degree of difficulty in breathing, referred by the patient to a "tightness in the throat," was superadded to them, and she discovered that she was unable to "snuff up" through the nose in inspiration, in the ordinary way. During two subsequent months the hoarseness, cough, and dyspnœa continued and increased; and about the commencement of February, 1818, she began to experience, in addition, a degree of difficulty in swallowing. In the beginning of March she observed a swelling, rather diffused, but said to have been of the size of a pigeon's egg, over the upper part of the thyroid cartilage, with an increase of the dyspnœa and dysphagia. A liniment was employed for this tumor, by which it was reduced in size, and the difficulty in breathing and in swallowing was diminished. In a short time, however, these symptoms became again aggravated, and they continued to augment until the month of August.

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* Vol. iii. art. 6. and 19; vol. iv. art. 16; vol. vi. art. 15; vol. ix. art. 4.

During the course of this affection Mrs. Hatton constantly referred the seat of the difficulty of breathing to a tightness at the upper part of the larynx. She has always been affected with cough, accompanied by a peculiar, harsh, croupy sound in the throat, at first, hard and dry, but more recently attended with the expectoration of viscid mucus, once tinged with blood. The dyspnœa has been constant, and lately much aggravated, precluding sleep, or putting a period to sleep by inducing a sense of impending suffocation, and rendering a raised position in bed absolutely necessary. Lately too she has suffered from fits of increased dyspnœa, threatening suffocation, obliging her to run for relief to the open window, and causing great anxiety and urgent distress.

Mrs. H. applied to me on the 15th of August, 1818. She was then affected with a degree of hoarseness, which rendered the voice scarcely audible. There was a perpetual dyspnœa referred by the patient, by the noise in breathing, and by the sound of the cough, to the upper part of the larynx. She swallowed with great difficulty and effort. There was an obvious general tumefaction of the parts about the larynx, occupying the left rather more than the right side. She stated that she experienced great difficulty in walking up a hill, or pair of stairs. She described the impossibility of snuffing up the nostrils, an effect, I suppose, of the partial closure of the larynx; for to produce this snuffing it is necessary that a certain *quantity* of air should be drawn through the nostrils with a certain *velocity;* and, in the present instance, the *quantity* of air admitted appears to have been too small. The patient experienced increased uneasiness on drawing the head backwards. A bougie was passed into the œsophagus, but met with no resistance.

On the 15th of August, I recommended five grains of the pil. hydrarg. to be taken every night and morning, half an ounce of the sulphat of magnesia, twice in the week, four leeches to be applied over the larynx every other day, and a lotion constantly, when the leech-bites were not bleeding.

On the 22d of August, I again saw Mrs. H. The symptoms were unabated. The mercurial had produced no effect on the gums. Mrs. H. was now induced to remain a short time in Nottingham. There was a degree of emaciation and debility; the pulse was rather frequent and feeble; the appetite impaired. The pil. hydrarg. was continued three times a day.

On the evening of the 24th, Mrs. H. was seized with an alarming fit of dyspnœa, to which I was witness. There was the greatest anxiety of countenance and manner; and in the breathing, every auxiliary muscle of respiration was called into exertion, and there was every appearance of impending suffocation. The dyspnœa had abated somewhat in violence, and there had been similar fits of dyspnœa before, or I should have immediately recommended the operation of laryngotomy. The difficulty of breathing abated gradually, and I left my patient in her usual state of dyspnœa.

In consultation with Mr. Oldknow, a most skilful surgeon of this town, it was concluded that the operation of laryngotomy was necessary to avert the danger of suffocation, incurred during the fits of dyspnœa. The operation was therefore performed on the 25th instant, and I am obliged to Mr. Oldknow for the following account of it.

" An incision was made through the integuments, beginning a little above the thyroid, and terminating a little below the cricoid cartilages. The external surfaces of these cartilages were then exposed, partly by incision and partly by the finger. An opening was then made into the larynx, a little below the most prominent part of the thyroid cartilage, and extended downwards to the upper margin of the cricoid cartilage. This incision not being sufficient for respiration, a crucial incision was next made through the membranous connection of the two cartilages; but still with an unsatisfactory result, for the breathing was performed only in part, and with great difficulty, through the aperture thus made. A circular portion, about $\frac{1}{8}$ of an inch in diameter, was therefore removed from the lower and lateral part of the thyroid cartilage, when the respiration became perfectly free, and the patient experienced the greatest possible relief. The cut edges of the integuments were kept asunder by straps of sticking plaster, passed from them towards the nape of the neck.

" *Remarks.* This operation was rendered more difficult than might have been expected, from the impossibility of the patient's reclining the head *backwards*, this position inducing greater dyspnœa. The larynx could not therefore be brought sufficiently forwards, and the depth of the incision was necessarily greater than was contemplated. The upper part of the thyroid gland, which appeared to reach higher than usual, was exposed. This gland was nearly in contact with the cricoid cartilage, so that an opening could not have been made through the upper ring of the trachea without the danger of wounding the gland and causing hemorrhagy.

" It may be said, that an opening made so high in the larynx, as in the present instance, is injudicious: first, on account of its affording less decided relief to the respiration, if there be extensive disease, and secondly, on account of the danger of wounding the vocal chords. With regard to the first objection, the decisive relief afforded to respiration in the present instance at least, is a sufficient answer. With respect to the second, if care be taken to remove a part of the thyroid cartilage to the extent above specified, from the inferior and lateral part of this cartilage, no injury will be inflicted on the vocal chords, their anterior attachment being nearly opposite to the most prominent and central part of the cartilage.

" On the other hand, the advantages of a permanent opening thus induced, are very considerable, especially when we consider the impossibility frequently experienced of employing a tube to insure the same effect. In the present case the introduction of a probe merely, induced the most distressing fits of convulsive coughing."

This operation afforded immediate relief to the respiration, and Mrs. H. slept soundly through the ensuing night, for the first time for a long period. Deglutition continued difficult, and always induced coughing during the five or six subsequent days. The cough raised some viscid mucus, which was forced through the orifice made by the operation. The voice was quite lost.

On the day of the operation the pil. hydrarg. was omitted, and the ung. hydrarg. was prescribed to be rubbed in, in the quantity of half a drachm morning and evening. The ol. ricini was ordered to open the bowels.

On the 28th, the mouth became sore. Mrs. H. soon afterwards experienced a mitigation of the difficulty in swallowing, and on applying the finger to the opening into the larynx, she found, in a short time, that the tightness in the respiration was also diminished, and that she could breathe with greater facility than before the operation, and, as she expresses it, more freely through the nose.

This amendment continued progressive, and on the 5th of September, the orifice into the larynx so far closed, after an attack of sickness and retching, induced by the ol. ricini, that the air only passed through it during respiration. On the 11th, the orifice closed finally; the respiration, however, was free, the swallowing easy, and there was a slight return of voice even. On the 13th, I again heard from Mrs. H., who had returned to Barrow; the amendment continued; the mouth was extremely sore. The ung. hydrarg. was ordered to be used more sparingly.

On the 22d, I paid Mrs. H. a visit. She was sitting up in bed. She breathed with perfect freedom, and had had no paroxysm of augmented dyspnœa since the time of the operation; she swallowed without uneasiness or effort, and, as she said, as well as ever; the whisper had advanced to a hoarse voice; and she could snuff up the nose with the usual force. Speaking, however, still required much effort, from the remaining hoarseness; and in swallowing, the skin just above the cicatrix was drawn into wrinkles, being raised by its adhesion to the thyroid cartilage. The tumefaction about the larynx had disappeared. There was scarcely any cough, and but the scanty expectoration of a little mucus. The general appearance, strength and appetite were improved. She could lie down, and slept the night through. The mouth was better, but still affected by the mercury.

October the 27th. Soon after the date of the last report, Mrs. Hatton imprudently left her bedroom, and exposed herself to the draughts of air in a room with three doors. She appeared to take cold in consequence, and a degree of difficulty of deglutition, and a loss of the voice formerly regained, was the effect. She came once more to Nottingham; she was once more put upon a course of the ung. hydrarg.; and in proportion as this remedy induced ptyalism, the dysphagia disappeared entirely, and the voice became again improved. To-day, two months after the operation, she only suffers from the effect of the mercury on the mouth; the respiration and the swallowing are quite natural, and the general health and appetite are good. She returns home, with the recommendation to continue the use of the ung. hydrarg. for a time, to put on flannel, and cautiously to avoid exposure to cold.

This state of amendment still continued on the 16th of December, and on the 8th of January, 1819, when Mr. H. called to give the most satisfactory account of Mrs. H.'s recovery and general health.

It may, I think, be fairly concluded that by means of laryngotomy and of mercury, this poor sufferer was saved from an inevitable death. This case affords, therefore, a striking instance of the efficacy of *Modern Medicine and Surgery*; for it is but justice to state, that the means employed were adopted principally on the suggestions of living authors, and especially of those whose names have been already mentioned.

OBSERVATIONS
UPON THE
MORBID APPEARANCES
AND
STRUCTURE OF BONES,
BEING THE SEQUEL OF A FORMER PAPER*.

By JOHN HOWSHIP, Esq.

Read April 27, 1819.

DIVISION II.

On Enlargement from swelling of the original substance of Bone.

HAVING in the preceding volumes of the Transactions pointed out the appearances and structure of nodes and exostoses, and also made some observations upon the formation of new joints, followed by a series of experiments to illustrate the exact mode in which the union of fracture takes place; I have now the honour to lay before the Society some remarks upon enlargement of bone, arising from spina-ventosa, and I propose continuing the inquiry by examining the appearances and changes produced in bone, by inflammation of its more compact structure.

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* See Vol. VIII. p. 143.

The term spina-ventosa has been applied to affections of bone so different from each other, that before describing the particular disease to which I consider this term most appropriate, I shall take the liberty to advert to the opinions of some few writers who have seen and attended to it.

Speaking of disease in the lower jaw, Wiseman observes, " it is made hollow by an acid humour, which fretteth and corrodeth the alveolar and inner substance to the very external shell, in which case it thrusts out with great deformity." He adds, " I have made mention of this disease under the name of spina-ventosa; and when this affects the jaws the teeth grow loose, and excrescences do arise which in progress of time thrust out the teeth. They sometimes pass their matter externally."

In the translated edition of Petit, among other valuable observations, is the following. " An old woman had for a long time a cancer in her breast, which gave her little disturbance; she was seized with a tumor in the middle of the left thigh, for which she had recourse to surgery. On examining her, I found that the body of the bone was swelled quite round; three days after it appeared to me to be more so. I judged there was an exostosis;

the sharp and continual shooting pains confirmed me in this thought; and their perseverance in spite of the remedies prescribed made me believe that the exostosis would imposthumate, and that the consequence would be a caries. It fell out just so, after two months' constant suffering, till she broke her thigh in turning in her bed. A tumor of the same nature broke out in her arm, and another at the clavicle, but were not so painful, because the bones broke sooner than the thigh had done." Now although in the above account the disease is termed exostosis, its history seems to be clearly that of spina-ventosa.

Mr. B. Bell says, "in scrofula we frequently find the whole substance of a bone become swelled, particularly the extremities of the large bones, forming the joints of the knee, elbow, ancle, and wrist, the term spina-ventosa being given to this swelling." If, however, by the extremities of the large bones, the epiphyses are to be understood, the expression seems hardly correct, at least I believe it will be found that enlargement of these parts from disease of any kind is extremely rare indeed.

In Cooper's Surgical Dictionary, a work filled with useful and correct information, two cases are related of abscess within bone, which although mentioned under the head of spina-ventosa, do not appear to me instances of the disease, wanting, as they do, that which has been generally considered its most essential character. The author, in a succeeding paragraph, with a diffidence which renders his acquirements more interesting, takes occasion to apologize for having stated what I conceive to be the plain fact. He says, "I described under the name of spina-ventosa a disease in which matter formed in the interior of a bone, attended with expansion of the part affected. In giving this meaning to the word spina-ventosa, the reader is already aware that I have only imitated many of my predecessors; and perhaps the original import of the term would vindicate me in so doing."

With regard to the pathology of spina-ventosa, I have, in my remarks connected with the attempt to arrange these diseases, ventured to state my belief that the natural secretions in the early stages form most commonly the contents of the tumor. This opinion was not brought forward without consideration, although I have not actually examined the recent soft contents of any early specimen of this disease. But we are in many cases enabled to reason correctly by analogy, as is subsequently proved by more direct evidence; and with relation to the present point, I have had opportunities of tracing the natural secretions in the cavities of bone under such various states of disease, some of them producing almost precisely the same effects as take place in spina-ventosa, that there appears to me very little room for doubt upon the subject.

Spina-ventosa, then, is an enlargement most commonly affecting the cylindrical bones, including the whole diameter of the affected part; generally connected in its progress, either with abscess of the soft contents of the tumor, or otherwise with a slow succession of changes, by which the bone with immense increase of size is at length totally disorganized.

The experiments and observations I have had the honour to lay before this Society, upon the formation and growth of bone, were made with a view to throw some additional light upon those principles of action by which the living powers are enabled to effect certain changes that take place both in health and disease, in these parts of the machine; and considerable time and labour were devoted to the making out clearly and completely the exact arrangement of the ossific fabric at the unfinished extremities of the cylindrical bones. The ascertaining this curious and leading point, has enabled me to demonstrate the facility which this arrangement is calculated to afford, for the subsequent application of a power by which there is every reason to believe the deposit of fluid secretions is made to perform all that could be expected from mechanical pressure, established by any other means, in regulating the growth, figure and structure of healthy bone.

The disease now under consideration exhibits occasionally the strongest illustration of the effect of pressure, in expanding or unfolding the structure of bone; and I think it may be assumed, that spina-ventosa commences with a degree of excitement in circulation upon the fine secreting membranes within the great canal or medullary cavity of a bone, and by the extension of this excitement to the membranous sheaths, passing thence through the more solid parts of the bone to its outer surface. The precise degree of this excitement will be variable even in the same case, or at least its operation is not at all times equally manifest; and as to constitutional circumstances connected with it, there generally appears more or less tendency to scrofula.

Most writers state the disease to be always attended with severe pain from the first, but I have in several instances seen the swelling proceed to considerable extent before it was noticed by the patient, who even then felt not the least pain, nor the slightest inconvenience; generally, however, it is painful, and in some cases extremely so. I am at present attending a child in whom several such tumors have formed in succession. In two of these swellings the enlargement of bone continued to make progress for many weeks without the least pain.

There is great diversity in the progress of the disease; it will in some instances advance further in a few days than it will in others in as many months. Wiseman says, "in children's fingers I have seen a bone swelled in a night, and a like tumor raised in the spongy bones of elder persons in a few days."

I have already stated my opinion that the apparent readiness with which the bone gives way, may partly be explained by the excitement pervading the contents of the canals in the solid parts of the bone, as well as those membranes within the general medullary cavity, in consequence of which the pressure is made to operate in an equal and diffused manner; for while the general mass of contents is maintaining a degree of pressure from within, the parietes of the bone are still further unfolded by the extension of the same principle to the innumerable canals dispersed through the compact sides of the ossific structure.

Where suppuration has once taken place within a disease of this kind, I have never seen the discharge spontaneously cease; nor does it seem to me reasonable to expect it should. The seat of the abscess is the enlarged cavity of the affected bone: the parts more or less perfectly consumed by the ulcerative process are the soft contents of that cavity, and even those membranous expansions which by their greater degree of vascularity are able to resist the first impulse of the suppurative action, have their powers of life so exhausted by the excitement, that they are on examination generally found in a disorganized or sloughy state.

The above observations apply to tumors which, comparatively speaking, do not reach any very extraordinary size, and which generally take place before the age of puberty. In some instances, however, more particularly in adults, the tendency to suppuration never occurs, and the tumor consequently has only one prevailing character, that of permanent growth or increase, until eventually it attains an enormous magnitude.

In the first description of case, the soft contents in the early stage of progress may be considered as little else than an excess in the deposit of the natural medullary secretions; in the second, they consist of fluid secretions, thrown off by the medullary membranes, and confined within the cavities of the bone. In the former case, after a moderate accumulation of imperfectly organized matter, the operation of any accidental circumstance is sufficient to excite suppuration; but in the latter the progressive change advancing with a more steady pace, is scarcely liable to this consequence, although in the end its effects excite astonishment.

The fluid secretions within bones affected by this disease, have the appearances that are known to belong to scrofula, and seem to be principally injurious by the expansion they produce. The membranes themselves, consistently with what is observed in parallel circumstances, become thickened in proportion to the degree of extension they undergo, and in some parts they are occasionally found to have become cartilaginous, and even ossified; the progressive steps to which change in the structure of membranes, I have traced in the paper already laid before the Society, upon the union of fracture.

Where an extensive formation of cartilage or of bone takes place in spina-ventosa, I believe it occurs merely as an accidental consequence of the near neighbourhood of some large medullary artery, conferring a comparative activity of circulation and vitality upon that particular part of the contents of the tumor*.

Du Verney, in his Treatise on the Diseases of the Bones, relates two very interesting cases of this kind, in one of which the humerus, in the other the femur was the seat of the disease. The first was that of a boy, who, from a fall, had an enlargement of the upper part of the arm, for which six months afterward he came to the Hotel Dieu, with a tumor of enormous size and weight, and a constitution so reduced that he died the following day. In the dissection, he states, " Monsieur Saviard examina la tumeur avec un très-grand soin, & il l'ouvrit à l'endroit où l'on sentoit qu'elle étoit molle. On vit que tout le corps de l'os s'étoit extraordinairement enflé, & qu'il formoit lui-même le volume de la tumeur, dont le dedans etoit tout rempli de plusieurs petites cellules de différentes grosseurs & figures, qui formoient une substance très-friable, & spongieuse, & qui etoient pleines d'une sérosité purulente." This tumor, which weighed ten pounds, was confined to the upper half of the humerus, both ends of the bone remaining perfectly sound.

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* Some interesting observations upon the circumstances under which new formed cartilage occasionally presents itself, may be found in Mr. Astley Cooper's valuable Essay on Exostosis.

The second case was that of a man who had an immense tumor, occupying a great part of the right thigh, which no treatment appeared to relieve, and which after many years ended fatally. On dissection, the structure of the tumor was found to be in every respect similar to that just described, although it had attained a much greater magnitude, its weight being twenty pounds.

Having endeavoured to point out the leading distinctions in the character and tendency of spina-ventosa, as it occurs under different states of constitution; and having taken the morbid anatomy of disease as a principal object in these essays, it only remains to bring forward some few demonstrative remarks, with a view to confirm the accuracy of the foregoing observations, and also to render more clearly intelligible the annexed illustrations.

In Mr. Heaviside's Museum there is a very comprehensive series of preparations, shewing the various causes and effects of expansion, together with the consequences of enlargement when produced by abscess within the medullary cavity of bone; some of which preparations we shall now proceed to describe.

The first of these specimens (Plate III. *fig.* 1.) is the radius of the right arm, from a youth about fourteen years of age. The cause of expansion in this case evidently continued to operate for a considerable length of time previous to the establishment of the ulcerative process, a circumstance proved by the unusual degree in which the external parietes of the bone are not only laid open, but thrown back. An effect that, according to my mode of reasoning, must have taken place previously to the formation of abscess, because it may be fairly presumed that matter once formed would soon find at least a partial, if not a free exit; subsequently to which no very material alteration of figure from internal pressure could reasonably be expected to take place.

The epiphysis, it will be observed, has taken no part whatever in the disease.

The next preparation (*fig.* 2.) exhibits a very fine example of this disease in the ulna, at the same period of life as the above; the epiphysis forming the olecranon not being yet completely ossified. In this instance also, the expansion had proceeded to a considerable extent previously to the formation of abscess.

It may be observed that the space surrounding the margin of the opening of the abscess, affords a curious contrast to the preparation last described. In this, the whole of the ossific structure is evidently much disturbed, every minute canal being so enlarged as to be obvious even to the naked eye; in that the parietes are seen to be nearly thrown back, without any appearance of disturbance in the minute economy of the bone beyond the margin of the external opening of the abscess. In the latter case the central pressure co-operated with that kept up within the surrounding canals in the bone; in the former the central pressure operated alone, proving that although both these agencies are frequently, perhaps generally, employed, they are nevertheless individually competent to produce all the effects connected with expansion in the ossific fabric.

Another specimen exhibits disease in the humerus, from a young person sixteen or seventeen years of age. Nearly the inferior half of the cylinder is so much expanded as to be at least six times its natural diameter, yet the bone is decidedly lighter than in its healthy state. The internal contents have in this, as in the former case, co-operated with those of the canals within the solid sides, to produce an equally diffused expansion of the whole of the affected part of the bone. There are in this instance several openings, by which the contents of the abscess had made their way out; with regard to the epiphysis, which has not participated in the disease, it is almost entirely separated, in consequence of the great enlargement in the body of the bone.

A fourth very fine illustration of spina-ventosa, shews the disease extending itself considerably, and losing the appearance of a circumscribed tumor. It is an ulna, which the epiphysis marks as having belonged to a young person, between sixteen and eighteen. The affection has produced great enlargement of nearly three-fourths the extent of the bone; although the part at which the affection originated is evidently near the joint, where the greatest degree of expansion has taken place, and where several openings point out the situation of the abscess, and the ultimately free passage afforded for the escape of the contents of the abscess.

There are in the same collection a great number of beautiful preparations of this kind, from the various bones of the hand and foot; one particularly, in which the first phalanx of the finger has been the seat of two distinct abscesses, while a third has taken place in the second phalanx; one consequence of which has been anchylosis of all three bones of the diseased finger. (See *fig.* 3.)

The last preparation that I shall at present take the liberty to bring forward, exhibits an instance of enlargement with abscess in one of the metacarpal bones of an adult; and it may here be remarked, that with considerable expansion of the bone a new appearance occurs, a change of colour, the parts immediately surrounding the abscess having lost the yellowish colour natural to bone, and become changed to a greyish white, so as to resemble a bone that has been calcined; a change which it appears probable may arise from the affected part having been partially deprived of its animal matter. (*fig.* 4.) This change in the colour of the bone, together with the age of the patient, renders it doubtful whether the disease was in this instance at all connected with scrofulous disposition.

DIVISION III.

On Enlargement with increased interstitial deposit of ossific matter, producing a more dense and compact structure than natural; as happens in healthy Ossific Inflammation.

Inflammation of bone is one of those processes in the animal economy not yet perfectly understood; its distinguishing symptoms are by no means determined; and so little has its morbid anatomy been investigated, that Mr. Hunter, in his lectures, and many other surgeons since his time, speak of inflammation from a venereal cause, though in the course of my experimental inquiry I have obtained no certain evidence that inflammation of the bones ever proceeds from this cause.

The terms in which I have ventured to define this action, are liable to objection. They may be allowed to be accurate, but not adequate. In what relates to the minute anatomy of the parts, the account may be very well, but will it enable the practitioner to distinguish the disease when he sees it? To this, the only reply I can make, is, that although well aware how incomplete these observations are, I am not without hope they may prove, even at the bedside, useful, if only by shewing that it does not follow that because pain is felt in a bone, or because swelling may be perceived taking place, or even from both symptoms together, the bone must be inflamed, although they both occur in ossific inflammation; for if that were the case, every node which I have already shewn to arise from a lamina of new bone deposited upon the old undisturbed structure, would be considered inflammation, and every deep seated venereal pain in bone would be supposed inflammatory; although I hope to be able to demonstrate that affections of bone occurring in conjunction with venereal complaints, depend on a peculiar mode of absorption, in no instance connected either with interstitial deposit, or actual swelling of the part.

The best apology for having brought forward these papers in their present imperfect state, is the hope that they may be the means of eliciting the more interesting and more valuable observations of others; and the conviction that had I determined to wait till every point was cleared up, and every difficulty removed, such expectation could have terminated only in disappointment.

With regard to the circumstances by which inflammation of a bone may be distinguished in the living body, it will, in the first place, be marked by very intense pain and sense of heat in the affected part of the limb, not much aggravated by external pressure, but connected with more or less excitement of the system; in the second place, it will be known by these symptoms occurring in a constitution otherwise healthy, for I believe that this affection never takes place but in a habit prone to phlegmonous inflammation.

But these circumstances will also occur in necrosis, and their extent as to severity and duration will be so variously modified, as to render it impossible to lay down general rules for determining the precise state of the internal parts by the external appearance. Practical opinion must be regulated by the estimate drawn from the consideration of every particular related to each case, the judgment being aided and strengthened by all the information we have been able to collect upon the subject.

The examination of the numerous specimens preserved in the anatomical collections of this metropolis, confirms the testimony of Sandifort, Weidman, and other eminent pathologists, in demonstrating that increase of bulk, and of weight, are the two principal characters of inflammation in bone. Sandifort also points out the occasional existence of fistulous passages, leading out from the medullary cavity, in this disease; and Mr. Hunter, in drawing a comparative view of inflammation in hard and in soft parts, does the same thing; but no one has gone further than merely to state the fact, at least as far as my reading extends. Upon this point, I hope to demonstrate to the satisfaction of the Society, the progressive operation of the living powers in the production of fistulæ; although, in fact, the whole circle of morbid changes to which these parts of our frame are liable, are so closely linked together, and form so curious and so intricate a chain, that it seems to me less difficult to examine and make them out, than it is afterwards to separate one from another, so as to set each in a distinct and clear point of view.

The being able to draw a very close line between the symptoms in any particular case, and the changes produced in the affected bone, although the first object in importance, is the last in attainment. I have watched many important cases with unremitting attention, and noted the progress of some of them for years, and have at last been prevented learning the event by some accidental circumstance from which I lost sight of the patient. The singularly valuable opportunities, however, that I have possessed, in having access to Mr. Heaviside's Museum, have operated as a powerful counterpoise to these and many other difficulties.

Impressed with the importance of the present inquiry, and anxious for its success, I deem it right to state that during its progress I have not chosen to trust exclusively to written notes upon a particular appearance, but have uniformly preferred the more laborious and slow, because the more secure mode, in making a complete series of tracings by the solar microscope* of every alteration of structure I have yet seen; so that by preserving the exact appearance of each specimen in a form most convenient for subsequent reference, I have in a great measure succeeded in placing my collection of microscopic specimens of diseases in bones on the same footing with other collections of diseases, where every known change of structure is as it were enabled to stand forward and plead its own cause.

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* For a considerable improvement in the mode of producing a clear and strong image by the solar microscope, I acknowledge with much pleasure my obligation to Dr. Roget, who, when its construction and defects were explained to him, very kindly proposed calling to see it when in action, an offer that, from one so extensively and deeply conversant with all the branches of mathematical science, could not be otherwise than acceptable.

Upon witnessing its operation, he at once pointed out that by diminishing the aperture of the lens through which the image of the illuminated object was transmitted, the clearness of the figure would be rendered much more perfect. I immediately made the experiment, by introducing a piece of blackened card, lessening the diameter of the aperture from one inch to one quarter of an inch, and was very agreeably surprised at the great increase in the beauty and brightness of the image. The real importance of this improvement can only be appreciated by those who have been engaged in researches similar to the present.

From all that I have been able to ascertain, it appears that inflammation of bone commences with excitement of circulation upon the membranes lining the longitudinal canals, or medullary cavities of the part. This excitement I have myself traced, in examining the contents of the canals so circumstanced, in their recent, and also in their injected state.

Having proceeded thus far, the next point of interest to determine was the state of the secretions under this excitement. This was ascertained by the careful examination of various dried specimens of inflamed bone; one piece, in particular, exhibited the appearances of inflammation with considerable thickening, near the upper end of the femur. It was divided into longitudinal slips, parallel to the axis of the bone; and the surfaces, rendered smooth, were examined in the compound microscope. The natural medullary contents of the canals were very distinctly seen, reduced to an adipocerous state, the constant effect of maceration upon these secretions. The actual presence, and even the peculiar consistence, of this substance was readily proved, by dislodging it with a needle point, while under inspection in the microscope.

The canals throughout the affected, as well as the healthy part of the bone, were found to contain one and the same kind of soft matter; equally abundant in the inflamed and tumid parts, and in those that were evidently beyond the sphere of irritation*.

The consideration of these appearances, first suggested to me the idea of obtaining a comparative view of these canals with their soft contents, and also of the same canals subsequent to the removal of their contents. For this purpose, a thin section of the specimen was so placed in the solar microscope, as to exhibit the magnified image very distinctly upon the screen. In tracing this drawing, the necessity which obliged me powerfully to illuminate the part on which I was at work, afforded an unexpected confirmation of the accuracy of my former observations, for the heat of the concentrated solar rays were soon observed melting down the medullary matter so rapidly as scarcely to allow time for the tracing to be made complete. The same piece was then calcined; and when reduced to a smooth surface and the structure cleared out, it was again placed in the microscope, so as to exhibit a second figure answering in magnitude to the one already taken. (See Plate IV.) These tracings afforded the clearest proof that under the greatest degree of change to which these canals appear to be liable from inflammation, the medullary contents suffer no material alteration as to their sensible qualities; from which I think it may be presumed, that any degree of increased action short of that which by destroying vitality would induce necrosis, is consistent with the continuance of the healthy actions of these membranes. Neither is this singular. The same excitement that in the pleura or peritoneum changes the natural texture of the membrane, pouring out a quantity of coagulable lymph, is so far from arresting the natural functions of the part, that one of the most frequent, and often one of the most formidable, consequences is the greatly increased quantity of serous deposit.

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* For the particular sense in which the term irritation is here applied, I must beg leave to refer to the 63d page of the eighth volume, where it is fully explained.

With regard to the condition of the membranes themselves, I have in various instances been enabled to ascertain that under certain states of excitement, as in that connected with exfoliation or necrosis, the membranous expansions within the longitudinal canals become thickened, pulpy, and granulated, as proved by their appearance when injected. Under inflammation, however, these circumstances occur most evidently. Several arguments in support of the above facts have been already laid before the Society, in a former paper*.

I shall now proceed to describe the changes produced by inflammation upon the earthy part of the ossific fabric, attending to the minute appearances of inflamed bone, subsequent to its having passed through the fire; and tracing these appearances along the line, from the state of perfect health on to that point at which all the consequences of inflammation may be perceived.

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* Vol. VIII. from page 62 to page 66.

The first perceptible change consists in a degree of uniform enlargement of the longitudinal canals, without any swelling of the general mass of the bone, or any increased deposit of phosphate of lime. The canals still retain the fine polish peculiar to them, and may be considered as exhibiting the effect produced by irritation only, in which the membranes commence a slow but uniform absorption of the surrounding substance. (Plate IV. *b.b.*)

The next change is marked by the canals losing entirely their healthy appearance. The longitudinal sections of these tubes, instead of even or gently inflected lines, present very unequal figures, the sides appearing as if scooped out with a semicircular chissel. This appearance is consequent to the membranous sheaths becoming not only thicker, but distinctly tubercular, or granulated, in their texture.

Where the inflammatory action has reached a higher point, the affected part of the bone is rendered tumid, and a new appearance occurs; for in addition to the abovementioned effects from absorption, a considerable deposit of ossific matter takes place. (Plate IV. *c. c.*)

The act of secretion can only be detected in the particles last laid down, for the more remote deposit is found to be so perfectly identified with the original bone as to prevent its being clearly distinguished; although by estimating the aggregate thickness of all the parts making up the solid side of the bone, it may be proved to have received a considerable addition of phosphate of lime.

In the compound microscope, the loose or scarcely attached particles of the phosphate of lime may be seen scattered in abundance, proving evidently the fact of secretion. These ossific particles may be observed deposited upon the sides of all those canals that have been subjected to active inflammation; but the freedom of secretion does not appear to bear any particular or necessary relation to that of absorption, for these two actions are very variably proportioned to each other, in different cases, and even in different parts of the same specimen.

In the foregoing view of the progress and effects of inflammation upon the bones, and indeed in all my previous observations upon health, as well as disease, the Society will have observed that the phosphate of lime, or earthy principle, is considered as related to the irritable or vascular system in bone, much in the same way that the materials of a building are related to the workmen employed in raising it. The vascular system, in connection with the irritable soft parts, are not only the active agents where activity is required, but their very constitution may be regarded as a security for the observance of certain provisional laws, essential to the safety and welfare of the general economy.

Where either as the result of external accident or internal disorder, the healthy action of any part of this system is disturbed, an impression of irritation arises; and this irritation is extended in one direction or another, according to circumstances, in the manner of a continuous sympathy, the results of which frequently exhibit the most demonstrative evidence of the perfection of that great scheme, by which the whole circle of operations and movements in the animated creation are harmonized and held together.

The particular direction in which a continuous line of irritation is propagated, will in most cases depend on the nature of the impulse required for ensuring the most favourable termination of the disease; to support, however, this position to its full extent, would be to anticipate in some respects observations that may with more propriety be made under the head of necrosis.

In the progress of inflammation in bone, the turn as well as intensity of action will vary extremely. Where, as sometimes happens from fevers, inflammation settles itself upon the membranes of the medullary cavity of a bone, the mischief, confined at first to one spot, forms a sort of point, or centre of action, from which all other impressions emanate. If this first centre of action proves intense, it disposes to the formation of a second, and between the two a consequent line of active irritation is presently established. This tendency in other parts of the economy is too well known to need illustration. It occurs under various circumstances, but in none is it more important, as regards the safety of the general system, than in inflammatory affections of the bones*. The principle appears to me to convey a precept of the highest possible consequence, in a practical point of view. It proves that the laws of irritability, which belong to all the soft structures in the body, are in effect extended to the more solid and less sensible texture of the ossific fabric, operating in various ways towards the reparation of injury, either by the restoration or the removal of the injured part; and it more especially illustrates the importance that nature attaches to the confinement of purulent fluid, in pointing out those provisions assigned even to the most inert materials of our frame, for the essential purpose of ensuring the production of a free outlet whenever matter is formed.

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* A very instructive case of this kind is published in the excellent and truly Practical Observations in Surgery, by the late Mr. Hey, of Leeds.

The considerable attention I have bestowed on the effects of inflammation, has enabled me to demonstrate the above circumstances relating to the production of fistulæ; and to those who have attended to the foregoing observations, there will, I apprehend, be little difficulty in perceiving how this consequence is brought about*.

It has been stated that inflammation commences with excitement of circulation in the membranes lining the longitudinal canals, this excitement operating internally by continuing and apparently increasing the quantity of secreted medullary matter, and externally by the progressive absorption of the surrounding bone; that in its more complete establishment these membranes become altered in texture, thickened and granulated, this change being connected with further increase in the quantity of medullary secretion, and externally with alteration in the appearance of the canals, corresponding to the granulated structure assumed by the absorbing surfaces of the membranes lining them; that in this stage tumor takes place, and in addition to absorption there is interstitial deposit of bone, these two actions observing no invariable relation to each other; and lastly, that according to the violence of the internal excitement, a line of irritation is propagated to some other part, the direct tendency of which is to establish a more intimate communion between the two points.

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* The principle upon which the absorption of bone takes place in carious spine, is, I believe, in some respects similar to that just explained. For a late opportunity of minutely examining the recent state of this disease, I am indebted to the kindness of my friend Dr. Merriman, who evinces the same pleasure in forwarding the inquiries and pursuits of others, that he experiences in the zealous and successful prosecution of improvement in that which is more particularly his own line of professional science.

Now, the extensive and free communication of the canals, demonstrated in a former paper on healthy bone, proves the readiness with which any impression of irritation from within the medullary cavity may establish its second point upon the periosteum covering the external part of the affected bone; and the above examinations have shewn that where this happens, the prevailing turn of action between the two points is always in favour of absorption, and the quantity of bone is thus progressively diminished until eventually the whole is removed, giving place to the recently formed granulated soft contents; and these also in turn, exhausted by excess of irritation, presently fall into ulceration, leaving eventually a free passage for the escape of purulent matter, sloughy membranes, or both, from the medullary cavity.

Having now traced forward the changes produced by the inflammatory and suppurative actions within bone, it only remains to make some few remarks upon the appearances connected with the decline of the increased action.

It is natural to expect, and indeed frequent examinations after death have proved, that where from inflammation a bone has become enlarged and heavy, it remains so, at least for many years afterwards*. The inflammatory attack having gone by, the increased activity of interstitial absorption and deposit subsides, while the membranous sheaths of the canals and cavities within the substance of the bone by slow degrees recover their natural structure and functions; the ultimate result of which is, that the medullary cavities and canals from being rough, as in the active stages of inflammation, present again the smooth and polished surfaces exhibited in health; there, however, the change appears to rest. (See Plate V. *fig.* 2. and 3.) The subsequent condition of bone so circumstanced, bears a close analogy to that of new bone or callus, formed after a fracture, the structure of which has been already shewn in my paper upon that subject. In both cases the mass of the ossific deposit constitutes a permanent tumor, any appearance of subsequent reduction of size being justly referable to the progressive decrease of thickening in the surrounding parts, and to that cause only. (See Plate V. *fig.* 2. and 3.)

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* A very singular case of inflammation of the superior maxillary bones, the history of which I have given in my Surgical Observations, I have lately had the opportunity of seeing after death, through the polite attention of Mr. Langstaff; in whose valuable collection the parts are preserved.

The bones are extremely heavy; but as neither of the tumors have been divided, the structure of course is unknown.

It has been stated in the early part of this paper that increase of bulk and of weight, are the two principal characters of inflamed bone; with regard to these circumstances, I made the following comparative examination, which proves that increased weight does not imply increase in density.

A transverse section, one-fourth of an inch in thickness, was removed from a femur much enlarged and very heavy, in consequence of inflammation produced by a partial necrosis at its lower extremity. A corresponding section was also taken from a large-sized healthy femur. The mean diameter of the cylinder of the inflamed bone was two inches and one-eighth, that of the healthy specimen seven-eighths of an inch; the weight of the inflamed piece was ʒvss.; that of the healthy bone scarcely ʒij. In this instance, therefore, the increased bulk had pretty nearly kept pace with the increased weight, and consequently there was no reason to conclude that any material increase of density, beyond the healthy standard, had taken place; and this opinion was borne out by the appearance of the specimen under the microscope, for in point of number the canals were in about the same proportion as in healthy bone, although in figure and arrangement they had assumed entirely new characters.

The annexed illustrations demonstrate the progressive changes that take place in the minute organization of bone, under inflammation, exhibiting particularly the mode of formation, and early appearance of a fistulous passage leading out from the cavity of an inflamed bone; they also afford a comparative view of the alteration of structure that occurs from inflammation in a cylindrical bone, and that which occasionally takes place from a similar affection of the flat bones of the cranium.

EXPLANATION OF THE FIGURES.

PLATE III.

FIG. 1.

An interesting example of spina-ventosa, in the radius.

FIG. 2.

An enlargement of the ulna, from spina-ventosa.

FIG. 3.

Diseased phalanges of a finger, affected with spina-ventosa.

FIG. 4.

Spina-ventosa, in a metacarpal bone.

The above specimens are all from Mr. Heaviside's Museum.

PLATE IV.

A longitudinal section of a portion of inflamed femur, five-eighths of an inch in length; as exhibited by the solar microscope.

The object in preparing this specimen was, to demonstrate on one graduated scale the different effects arising from the various degrees of excitement, connected with an attack of inflammation. A drawing was made in 1816 for this purpose, and in order to obtain it more minutely correct it was made on a larger scale; upon which account, however, it was subsequently laid aside, and the present one taken the following season, was preferred as being more convenient; comprehending a moderately magnified view of the whole sufficiently distinct, and capable of being rendered quite perfect by the addition of a small part, represented as seen on a much larger scale, which part forms the first figure on the next plate.

a. That part of the specimen where the first and least degree of change is observable in the minute structure of the bone.

b b. The longitudinal canals at those parts where the excitement has effected those changes connected with absorption, without having proceeded to that stage productive of increased deposit.

c c. Other canals, continuous with the above, where the roughness of surface marks the recent deposition of ossific matter.

d. The seat of the more completely established inflammatory action, where the appearance of the canals is marked not only by the considerable absorption, but also by the more diffused deposit of ossific matter, with a degree of external tumor; the latter circumstance resulting from the pressure of the soft contents producing a slow developement of the old structure, and a fresh deposit of ossific matter, the joint effect of both these operations being an increase more or less considerable, in the quantity or substance of the original bone.

e e. Some of those points at which it may be perceived that the actions in the soft contents of the canals are, from some cause, taking a turn favourable to absorption; which cause, is no other than the increased irritation established in the continuous sympathy, by which the membranes covering the inside and outside of the bone are connected together; and which operates by increasing the quantity or volume of the soft contents of the canals, while it diminishes nearly in the same proportion the quantity of bone interposed between those canals.

f. Exhibits the final result of the action just adverted to. The continued absorption, and the increasing volume of the soft contents in the longitudinal canals upon the immediate line of sympathy, having at length brought the membranes of the various canals into contact with each other, or in other words, removed the whole of the interposed bone, the space is of course occupied by soft parts only; and as this action is extended across all the canals situated between the two surfaces of the bone, the whole of the bone upon that line is removed, and a fistulous passage out from the general medullary cavity is the result.

g. The external opening of the fistula.

h. The internal opening of the fistula, which is yet incomplete.

i. The square figure, including that portion of the specimen which forms the following figure.

PLATE V.

Fig. 1. The part included within the lines marked *i.* upon the former plate; exhibiting on a much larger scale, and consequently with more minute accuracy, the appearance of the surfaces and sections of the longitudinal canals under inflammation.

Fig. 2. Exhibits the appearance of a longitudinal section, one-tenth of an inch in breadth, of a femur that from inflammation had been much increased in bulk and in weight. The structure of the bone, it may be perceived, does not when magnified appear to be more compact, although in figure and general character the canals are much altered from their natural condition, demonstrated in the illustrations given with a former paper*. They had, however, in the present instance recovered their smooth and polished surfaces.

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* See the lower figure on the left hand of Plate VI. in the 7th Volume of the Transactions.

Fig. 3. A section of the frontal bone of a cranium which had suffered a severe as well as tedious attack of inflammation, rendering it more than twice its natural thickness, extremely heavy, and so compact that it was difficult to perceive any remaining trace of diploe with the naked eye, the bone having the appearance, and taking the polish, of ivory.

This affection appeared to originate from the irritation produced by a part of the external table, which had been destroyed by necrosis, while the powers of the constitution were not competent to effect its separation; the circumstances of the case may, however, perhaps be noticed on some future occasion.

a. The margin of the internal table of the frontal bone.

b. The margin of the external table.

c. That part of the specimen where the cells of the diploe are most completely obliterated.

d. A considerable and extensive cellular space, where the obliteration of the natural structure has been less perfect.

CASE

OF

CAROTID ANEURISM.

By J. P. VINCENT, Esq.

SURGEON TO ST. BARTHOLOMEW'S HOSPITAL.

Read March 30, 1819.

THE carotid artery has of late been so often taken up, that the operation in cases of aneurism is no longer rare. But this, like all important operations, has not been performed so frequently as to perfect the pathological views of the case, or to preclude advantage from bringing into comparison circumstances of detail. I venture, under such an impression, to relate to the Society the following case.

December 10th, 1818, James Humphriss was admitted into St. Bartholomew's Hospital, with an aneurism of the carotid artery. He was a glass-cutter by occupation, aged fifty-two. About three months before his entrance into the Hospital, he had been knocked down and beaten about the right side of his head, in which he had suffered much pain. Seventeen days previously, he discovered a pulsating tumor behind the angle of the lower jaw, on the right side. At the time of his admission it was about the size of a pullet's egg; he was suffering severe pain over the right side of his head, and the whole arterial system beat with powerful action. He had been taking mercury, and was in a state of ptyalism.

On account of this last circumstance the operation was deferred until the 19th of December; during which interval the tumor had somewhat increased. In reference to the operation, it is proper to notice, that the omo-hyoidæus muscle so completely traversed the wound, and its connections being more than ordinarily firm, it could not be pressed aside, and some of its fibres were necessarily divided. The artery was brought into view on the inner side, next the trachea; and the theca was so firm and dense that it was necessary to use the knife in separating it; after which a single ligature was drawn upon it. The internal jugular vein did not at all protrude in the way.

After the operation the right subclavian artery beat with increased force; but this did not continue. The pulsation in the aneurismal tumor did not cease on drawing the ligature, although it was much more faint. The patient said he had lost the severe pain in his head, and felt only a slight pain over the right eye, and an uneasiness in the right shoulder, which soon went off. He suffered no irritation in the larynx or pharynx. The pulse at the wrist was much weaker than before the operation.

8 o'clock, p. m. Has lain very quiet since the operation. The intellect is quite clear; and there is no affection of the nervous system, no irritation in the trachea, no accumulation of mucus. He has swallowed a pint of panada with perfect ease. There is no uneasiness in the neck, but some slight pain over the forehead, and also in the abdomen; he has passed no urine; pulse about 80 and soft, but beating with more force in the right than in the left arm; tumor reduced in size about one half, and faintly beating. He expresses himself to be much more comfortable than before the operation.

20th. He has no pain in the head; no difficulty of deglutition; no irritation in the trachea; pulse about 80 and soft. Has much uneasiness and sense of fulness in the abdomen, extending from the epigastric to the right hypochondriac region.

21st. He is quite as well as yesterday, except in having a slight irritation of the trachea; pulse 80 and soft. The tumor is not more than a quarter the size it was before the operation; and there is no pulsation in it.

22d. The patient has a slight increase of irritation in the trachea, and a little cough to get up mucus. The wound was dressed for the first time, and the upper part of it had healed.

29th. No irritation in the trachea. He is going on very well, and is comfortable, with the exception of the uneasiness in the abdomen, which has continued.

January 10th, 1819. The ligature came away in the dressings, this morning; and immediately he lost all uneasiness in the abdomen, which had never ceased since the operation.

14th. The wound has thrown out some fungus, and discharges rather freely; in other respects he is well.

21st. The fungous appearance of the wound has rather increased; it had ceased to discharge. In the evening the neck swelled considerably between the wound and the jaw.

22d. The right side of the neck is very tumid; the swelling extending from the middle of the wound to the lower jaw, affecting deglutition, but not at all the breathing. The fungous granulations are glassy, and the wound produces no discharge. The tongue is covered with a white coat; his pulse is quick, and he has had a disturbed night; the swelling however did not increase. About eight o'clock in the evening he became very ill, complaining of being low and uneasy; had great difficulty of deglutition; a fit of coughing came on, and respiration grew difficult. He was quite sensible. Mr. Lawrence, happening to be at the Hospital at this time, saw him, and made an incision into the aneurismal tumor, from which a small quantity of pus and coagulum issued; he expired immediately afterwards.

23d January. An examination of the state of the parts was made fifteen hours after death. The process of obliteration of the artery below the ligature was complete; the vessel being perfectly closed, a plug was formed, extending downwards as far as the division of the arteria innominata. The artery above the ligature was open and inflamed, and pus was found in it. The aneurismal sac had undergone the proper changes to effect a cure; it was contracted around a firm coagulum, and the inner surface of it bore no indication of having been inflamed. Thus the pus, which issued from the incision, must have been the product of the inflamed artery. The sac was formed at the bifurcation of the common carotid. The aorta and other large arteries were so increased in size, that the area of their sections was nearly doubled. Globules of air were found adhering to the inner surface of the aorta and other large arteries; and in the head air was found under the tunica arachnoidæa. The bulk of the swelling in the neck, which came on the day previous to his death, seemed to be formed of serous effusion in the cellular tissue.

In viewing the progress of this case, it seemed to be a striking effect of the operation to subdue the action of the arterial system; as from the time it was finished, the pulse became so very much softer than it had been before. And the uneasiness and feeling of fulness of the abdomen may be fairly attributable to the presence of the ligature so near the par vagum, keeping up irritation upon it, as the whole sensation ceased the moment the ligature was removed. It is, probably, to the diseased state of the vessel that the inflammation of that portion of the artery which was between the ligature and sac must be referred. And, perhaps, in the fact of air being found introduced into the arterial system, may be discovered the cause of the sudden termination of life.

ON THE

USE OF ARSENIC

IN THE

CURE OF CHOREA.

By Mr. SALTER, Surgeon, of Poole.

COMMUNICATED

BY MR. TRAVERS.

Read April 27, 1819.

ALTHOUGH much has been written on the subject of Chorea, and various remedial agents have at different times been brought forward as cures for that disease, still there has been so little uniformity in the experience of the different members of the profession, in the plans proposed, that I believe I may assert, without much hazard of contradiction, there are but few complaints on which the profession at large are less agreed as to the most proper mode of treatment. It will hereafter most probably be found, that this discrepancy has arisen, not so much from the want of efficacy in the several plans and remedies that have been had recourse to, as from some peculiarities in the cases or constitutions of the patients, which may have rendered them abortive; these peculiarities having been either overlooked by the medical attendants, or they were such as our present imperfect knowledge of the pathology of the disease did not enable them to discover. However, as experience and observation can alone form the true basis of a legitimate pathological theory, it may yet be advantageous to add further to our record of successful cases, and more especially if any novelty in their symptoms or mode of treatment recommends them to our notice. Under these considerations, I have been induced to lay the following cases before this learned Society, thinking a narration of them might prove useful and interesting.

In the fourth volume of the Medico-Chirurgical Transactions, there is an interesting paper relating a case of Chorea Sancti Viti, which was cured by arsenic. Soon after reading this communication, an instance of that disease came under my care. I first adopted the purgative plan of treatment recommended by Dr. Hamilton; but finding no advantage derived from this procedure, I was induced to make trial of the liquor arsenicalis, and had soon the happiness to find my patient rapidly recover. Since this period I have had the management of three other examples of the complaint, and with all of which, pursuing the same plan, I have been equally successful; but as the pilulæ gambogiæ compositæ in Mr. Martin's case, above alluded to, was taken every night in addition to the arsenical solution, it may perhaps be supposed, especially by those who advocate the exclusive employment of purgatives, that in the case which that gentleman has brought forward, the cathartic was the principal means of cure. In those cases, however, which I am about to relate, no other medicine was used than the liquor arsenicalis, nor was any change of regimen allowed; its efficacy therefore in them must be considered as incontrovertibly established. They were not selected from any notion of their being peculiarly favourable ones to submit to the trial of the liquor arsenicalis, but were taken indiscriminately, as the patients applied for relief. As they comprehend individuals of both sexes, one of whom being arrived at the adult age, and another having laboured under the affection in the severest degree, they may be considered as exhibiting a fair trial of the medicine; and will therefore enable the practitioner to form a tolerably correct estimate of what may be expected from arsenic in the cure of chorea. Moreover, the efficiency of such small doses will disarm the medical attendant of any dread he might otherwise have in resorting to so potent a remedy. By a perusal of the cases, it will be observed, that whilst the patients were taking the solution, the bowels acted freely; and in the case of Elmes the peristaltic motion was considerably increased; indeed, I am inclined to believe that it exerts some degree of purgative influence upon the intestinal canal;

and it does this perhaps indirectly, by stimulating the liver to a more copious and healthy secretion of bile, through the medium of the biliary ducts, or by the connexion of the nerves of the stomach and duodenum with the hepatic plexus. If, on further trial, it should be found to have this quality combined with such remarkable tonic powers as it is known to possess, its extensive influence over chorea will be satisfactorily explained, and hence its employment may perhaps be suggested in other diseases of debility, where there is great derangement of the nervous and digestive symptoms. By the foregoing observations, I by no means wish to be understood to think the use of those medicines usually styled purgatives at all times unnecessary in chorea; for though more extensive experience has not entirely fulfilled the high expectations entertained of that class of medicines by the excellent physician who first recommended them, in the disorder under consideration, still, as auxiliaries, we have abundant proof of their good effects; and I believe that cases do sometimes occur, in which they are the most appropriate and the only means necessary to cure the disease. Nor would I have it supposed to be my intention to disparage or entirely exclude many other curative means of tried utility; my object in obtruding upon the attention of the Society, being merely to shew the great and decided influence that arsenic has at least over some instances of chorea; and that it is likely to become in the hands of intelligent practitioners a valuable addition to our list of remedies for that troublesome complaint.

April 30th, 1817.

Eliza Hardiman, seventeen years of age, with a dark complexion, dark eyes and hair, has had Chorea Sancti Viti for three months. The muscles of the arms are mostly affected with the irregular and involuntary motions, but those of the trunk and lower extremities are considerably under the influence of the disease; indeed the whole body is frequently thrown into the most grotesque attitudes. The bowels constipated; catamenia regular. She complains of headache, pain chiefly in the forehead; her nights are very much disturbed by frightful dreams and by the spasms of the muscles; appetite good; pulse 80.

℞ Hydrarg: Submuriat. gr. j.
Pulver: Scammoneæ gr. x.
fiat Pulvis omni mane sumendus.

May 5th. She has taken four of the powders, and has been much purged by them. The appearance of the first evacuations from the bowels was not attended to; they now mostly consist of mucus from the large intestines. The complaint is rather worse than better; the jactitations being stronger and at all times more evident.

Intermittatur Pulvis.
Habeat m. iv. Liquoris Arsenicalis ter die.

May 7th. The involuntary motions of the muscles are thought to be somewhat less violent; bowels regular, and the stools natural. She is directed to go on with the liquor arsenicalis, adding one drop to each dose every day.

May 17th. The patient is so much better that she is apparently getting rapidly well; fourteen drops of the liquor arsenicalis are now taken three times a day. She is directed to persevere in its use, but without increasing the dose any farther.

June 3d. The medicine has been continued to the present time, in the same dose as last reported; there are now scarcely any remains of the disease. She is perfectly still, even whilst conversing, which heretofore never failed for the time to produce a slight aggravation of the symptoms. Her bowels are regular, and the motions of a good colour. She has however passed over her usual period of menstruation, and within these few days has been troubled with a short, frequent, and dry cough. Her tongue is slightly furred and white; appetite not so good; pulse 100; yet, notwithstanding these symptoms, her appearance is greatly improved since she has been taking the arsenical solution, and she is considerably increased in flesh. The beneficial effects of the medicine are strikingly apparent, both in removing the irregular and involuntary motions of chorea, and in improving the general health; but as the objects intended in its administration have been obtained, it is now discontinued for the following:

℞ Mistur. Ferri: Comp. ℥iss bis die sumend.
℞ Pil. Aloës cum Myrrha gr. viij.
Extracti Papaveris gr. v. Misce et fiant Pilulæ tres omni nocte maneque sumendæ.

June 10th. The patient is in every respect much better; the cough is nearly gone; pulse 80; appetite tolerably good; she has not had however any return of the catamenia. The pills have acted very freely upon the bowels; they were not taken yesterday, as she thought they weakened her. She complains that the mixture makes her sick; she is therefore ordered to take in its stead twelve grains of the Pil. Ferri cum Myrrh., three times a day, drinking after them a teacupful of camomile flower tea.

July 18th. The Pil. Ferri cum Myrrh. has been continued ever since the last report. The catamenia have returned, and she seems in every respect quite well. Though the solutio arsenicalis was so early left off, there has not been any return of chorea.

CASE II.

Miss P——, nine years of age, of a dark complexion, spare habit, and delicate constitution, was affected with chorea, September 6th, 1817. Fear is supposed to have been the exciting cause of the disease; one of her school-fellows having suddenly appeared before her in a mask, at which she was greatly alarmed; and though she was one of those persons whom on seeing, any practitioner of experience would have supposed likely to become the subject of the disorder, yet it is clearly ascertained that previous to this circumstance she had no symptom of the complaint, and that it supervened immediately after. The free use of purgatives, with the decoct. cinchonæ, was tried till the 24th, without her obtaining the least benefit; on the contrary, the symptoms were daily augmenting in severity; her nights were greatly disturbed, and she was incessantly in motion during the day. The function of speech was nearly suspended. At this period she commenced with the arsenical solution, in doses of three drops three times a day. On the 28th, but little difference was found in the state of the patient; she was however rather better than otherwise; it was directed that the medicine should be continued in the same dose.

Oct. 21. The solutio arsenicalis has been regularly and sedulously taken, occasionally increasing the dose one drop; seven are now taken for a dose. A great and striking impression has been made upon the disease; indeed the patient is at this time so much better, that I anticipate she will soon be able to leave off medicine.

Oct. 30th. There have been no symptoms of chorea for the last four or five days, and scarcely any subsequent to the last report. Miss P. is now supposed to be in better health than before the commencement of her illness. The quantity of the medicine has not been increased: it is now discontinued.

At the end of ten days the complaint again manifested itself, and the sleep as before was considerably interrupted by the jactitations. The use of the solution of arsenic was at once resumed, and with the happiest effects; for, in the course of a fortnight, all the symptoms were a second time entirely removed: but I thought it prudent, notwithstanding the patient appeared quite well, for her to persevere in the solution for some considerable time longer, and it was consequently taken five or six weeks, and then entirely omitted.

Up to this period she has remained in good health, without experiencing the least return of the disease.

CASE III.

Oct. 27th, 1817. Mary Brown is twelve years old, tall for her age, and of a fair complexion and delicate constitution. This patient has been affected with chorea for a considerable period, and for the last six weeks has had it in a very violent degree. Though the muscles on the right side of the body are mostly under the influence of the morbid action, yet the whole system of voluntary muscles is subject to the jactitations, which during the day are uninterrupted, and at intervals are exceedingly violent; and notwithstanding at night the convulsive motions are less frequent, yet they often then take place to such a degree as to deprive her of sleep for several nights together. To prevent her injuring herself in the exacerbations of the disease, persons are employed to hold her; and at all times when out of bed it has been found necessary to fasten her to her chair. She has a fatuous look; and besides being wholly unable to walk, is entirely deprived of the power of articulation. The bowels are regular, and the evacuations natural; tongue clean; pulse 92 and feeble. Though she has been allowed to indulge in a voracious appetite, she is become much thinner since her illness. I ordered her to take the liquor arsenicalis, beginning with three drops three times a day, increasing the dose one drop every day, until as much is taken as the stomach will bear.

Nov. 1st. She is much better; the convulsive motions during the night are now very inconsiderable, and her sleep is sound and as much as is necessary; even by day she no longer requires to be tied into the chair. She has spoken once or twice. The medicine is taken in five drop doses.

Nov. 9th. The patient is progressively improving: yesterday, for the first time, she walked across the room without assistance. She begins to use her right hand; her speech is greatly improved, and she is lively and cheerful. She eats heartily, but her appetite is less voracious; the bowels continue regular, and the discharges are of a proper colour. She now has seven drops of the solution for a dose; and as the one taken in the morning makes her a little sick, I have directed that the quantity might not be increased.

Nov. 20th. The disease is so far removed that she is enabled to dress and undress herself with ease. She walks well, and articulates with tolerable fluency. The medicine continues to nauseate the stomach in the morning. The same dose is ordered to be persevered in.

Nov. 27th. The patient may now be considered as quite recovered; there does not appear to be the least symptom remaining of her unpleasant complaint. She is at this time working with her needle, and has just read to me a short poem, to shew how perfectly she has recovered the power of articulation.

To prevent a relapse, I have desired that she might continue her medicine a week longer.

CASE IV.

June 2d, 1818. John Elmes, fourteen years of age, of a fair and florid complexion, has had symptoms of chorea for six weeks. Three years ago he laboured under the same disease for the space of six months. During that attack he took a variety of medicines, which his father thinks were but of little service to him; the complaint having at length been got rid of rather by the spontaneous operations of nature than cured by art. He has constant involuntary and irregular motions of both superior and inferior extremities; the right side is more affected than the left; his sleep is very much disturbed by the disease; he has also some difficulty of articulation, and complains of occasional pain of the head. The tongue is covered slightly with a white fur, and the papillæ are somewhat elongated. He has at times pain at the scrobiculus cordis, which however is not aggravated by pressure or by taking food. The bowels are said to be regular, but he does not have more than two evacuations in three days; appetite unusually great; pulse 80.

He is directed to take three drops of the liquor arsenicalis three times a day, increasing the dose one drop every other day.

June 9th. The involuntary motions of the muscles are much diminished. The tongue is still white; appetite voracious. The bowels are open twice a day. He takes six drops of the solution for a dose; he is ordered to increase it as before, until ten are taken.

June 22d. This lad continues improving. The tongue is cleaner; pulse 76. He has regularly three evacuations from the bowels every day. Augment the dose as before to fourteen drops.

August 1st. The patient since his illness has resided with his friends at Wareham, ten miles from Poole, but he is apprenticed to a coachmaker in this town. As I had not heard of him since last report, I called at his master's this morning to make some inquiries after him, when t omy surprise I found he had returned to his work as usual quite well. He told me, that being recovered, he came back to this place three weeks ago, and that he had continued his medicine till that time in doses of ten drops, but could not exceed that quantity without becoming sick.

Poole, Dorset,
Oct. 1818.

ON A NEW METHOD OF PREPARING PHARMACEUTICAL EXTRACTS.

BY JOHN T. BARRY.

COMMUNICATED

BY DR. MARCET.

Read May 25, 1819.

IT has not failed to be matter of regret with medical men, that many of the pharmaceutical extracts, although prepared from materials of the same quality, vary considerably in their efficacy, in consequence of having suffered partial destruction in the process of inspissation. This has justly been attributed to the excess of heat employed in their preparation; and it seems also to be generally allowed, that the presence of atmospheric air, by affording oxygen during the process, is injurious. There are some other circumstances attending the common mode of evaporation, which likewise operate as minor causes of uncertainty in their efficacy, such as the degree of agitation or stirring bestowed on the fluid; the surface exposed and the depth of it in the evaporating vessel; but especially the quantity operated on at a single process, as on this must depend the duration of the destructive causes. Considering all these as concurring circumstances, we are forced to admit, that it is scarcely possible to produce two different parcels of an extract by the common method, which shall each possess the same efficiency. Hence, a disparity in the effects of these medicines does frequently occur; and independently of the evil arising from the use of inferior materials, this disparity is the ground of just objection to the use of extracts, from the natural reluctance a medical man feels to administer remedies, the strength of which he has no standard to ascertain; and this objection is rather increased by the circumstance of our being unable to separate, by any purifying process, the efficacious part of an extract from the part which has become inert. Solution, crystallization, or precipitation, means which yield us superior advantages in the preparation of saline and metallic substances, are here of no avail. It has therefore long been a desirable object to possess means less exceptionable than those hitherto in use, for the preparation of this class of medicines; and conceiving that a method of my own (which has been carried into execution on a large scale, and is free from the chief objections to the common process) is possessed of some practical utility, I have thought the subject would have sufficient weight to entitle the present communication to the attention of this Society.

By the present nomenclature of pharmacy, the term extract* is applied to the inspissated residua of vegetable solutions; some of these solutions are imperfect, and the residua obtained from them must in every case be of a very compound nature. These solutions are natural, being the expressed juices of plants; or artificial, consisting of decoctions or infusions of vegetable substances. The menstruum in general is water; but of the latter description some few are alcoholic mixtures. Most commonly the menstruum is intended to extract all the active ingredients; in a few cases it is designed to dissolve but certain parts of them; and with respect to the inspissated juices, the utility which they should possess, is that of presenting in a concentrated and durable form, the medicinal virtues of the recent juices. Our business then in forming an extract, is to reduce to a solid state the medicinal part of the solution; to withdraw the menstruum, and preserve in the residuum the same efficacy in kind and degree which the solution possessed, except such as depends on matter, which, in a chemical sense, is volatile. And some plan which shall accomplish this is what we seek; perhaps it is attainable: if however perfection is not to be expected, still, if a process which presents the means of producing the extract of uniform quality can be offered, it will secure what is certainly our principal object.

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* Except in the instance of the extractum elaterii.

In order to prevent the injurious effects of heat on medicinal extracts, I proposed some years since, in conversation on the subject, to conduct the evaporation in vacuo. The low temperature at which fluids are known to boil in exhausted vessels, together with the supposed advantage this plan possesses of preventing the access of oxygen, led me to expect decidedly good effects from its execution.

The subject selected for the first experiment was a solution of opium. The next was some juice of hemlock. Both of these were evaporated in a water-bath, the vessels having been exhausted by an air-pump; and the products exhibited appearances, which left no doubt of the superiority of this method for preparing extracts. Accordingly I decided on carrying the project into execution at some future day; and on shewing a sketch of the necessary apparatus to my partner William Allen, I had the satisfaction of finding that his opinion supported my own. Soon afterwards it was submitted to my friend Dr. Marcet, who not only gave it his approbation, but so strenuously advised its adoption, that it was concluded on to have the vessels constructed on a large scale. It is remarkable, that only a short time before the large apparatus was made, this gentleman received from Professor Jaenisch, of Moscow, a communication on the same subject, proposing to prepare extracts in vacuo. Dr. Marcet thought it proper on that occasion, to advise my not being informed of the plan of the Moscow Professor, till my own apparatus was finished.

To persons acquainted with the process of Edward C. Howard for refining sugar, and for which he took out a patent, it may appear that I have but small claim to invention, for proposing a very similar process to obtain extracts. The two kinds of apparatus are however materially different. I employ no pump, or machinery, but produce the exhaustion wholly by steam; and the vacuum is maintained in my vessels by immersion of the whole in water*. The difficulty with which air is prevented from finding its way into exhausted vessels, seems the chief impediment to conducting evaporation in vacuo. This difficulty, by the simple expedient just mentioned, is completely remedied. The apparatus being thus rendered easy of management and less expensive, appeared likely to be employed in some other large manufactures, such as sugar-refining and colour-making; and on that account I have been induced to take out a patent for it. It is, however, to be recollected by this Society, that I have declined having a patent for its pharmaceutical products. Chemists, desirous of inspissating extracts in vacuo, are therefore at liberty to do it in any apparatus differing from that which has been made the subject of my patent; and thus these substances may continue the objects of fair competition as to quality and price.

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* This idea, original with myself, was some time since publicly made use of for a particular object; and lest I should be supposed to have borrowed it from the invention alluded to, I may here take leave to say, that its adoption, in that instance, was the result of my own advice.

Notwithstanding the disadvantageous circumstances which generally attend inspissation in the open air, I have little doubt that many of the extracts might be obtained in that way, of very superior, though perhaps not of uniform strength, by complying with certain conditions, which are, however, suited only to the scale of philosophical experiment, or the consumption of an individual practitioner. But it is well known that the trouble attendant on these preparations, renders it much more convenient to purchase than to make them. Hence it has become the business of the druggist to supply extracts; and making them on a scale proportionate to his demand, he is obliged, in order to produce rapid evaporation, to subject them to a temperature, little, if at all, short of 212°, one that seems to be decidedly injurious. This happens even when the steam-bath or the water-bath is employed; and extracts so prepared must still be considered as having been partially subjected to the contingencies before-mentioned. In fact, it may be stated on good authority, that extract of rhubarb, for instance, when inspissated in vacuo, is fully twice as effective as when boiled down in the open air over steam.

Any improved method then for extracts to become really useful, must be adapted to the large scale of manufacture; and this is one of the features of the method which I propose, for it admits of being carried into effect to almost any extent, and with a proportionate diminution of cost.

As perhaps it will be satisfactory to the Society to form for themselves a judgment upon the fitness of the method I have adopted, and of the apparatus by which it is carried into effect, I propose here to describe them both. The mode of procuring the vacuum, and the manner of maintaining it, have already been mentioned. The degree of exhaustion is of course judged of by the column which is supported in the mercurial gage; and I think it will excite some surprise, when it is stated, that although no pump is employed, yet that column is often at a height of 28 inches during rapid ebullition. In fact, it is common to operate with a column not two inches less than the barometer of the day, and at such times the temperature of the boiling fluid is below 100° Fahrenheit, often at 95°; and I am satisfied that by certain improvements this temperature may be reduced to less than 90° in the ordinary process of manufacture. The vessels employed in the apparatus first put up, were two; the one of cast iron, polished on its inner surface, serving as the evaporating pan, and situated in a water-bath; may be called *a still.* The head of it leads into the second vessel, which is a large copper sphere, about three times as large as the other, and surrounded at pleasure by cold water; it may be called *the receiver.* In the pipe which connects these two is a large stop-cock, by which their communication with each other can be suspended. The manner of setting it to work is this: the juice or infusion is introduced through a large opening into the polished iron still, which is then closed, made air-tight, and covered with water. The stop-cock which leads to the receiver is also shut. In order to produce the vacuum, steam is allowed to rush through the copper sphere, until it has expelled all the air, for which five minutes is commonly sufficient: this is known to be effected by the steam issuing uncondensed. At that instant the copper sphere is closed, and the steam shut off; and then cold water admitted upon its external surface. The vacuum thus produced in the copper sphere, which contained about four-fifths of the air of the whole apparatus, is now partially transferred to the still by opening the intermediate stop-cock. Thus four-fifths of the air in the still rushes into the sphere, and the stop-coek being shut again, a second exhaustion is effected by steam in the same way as the first was: after which a momentary communication is again allowed between the iron still and the receiver; by this means four-fifths of the air remaining after the former exhaustion is expelled. These exhaustions repeated five or six times, are usually found sufficient to raise the mercurial column to the height before-mentioned. The water-bath in which the iron still is immersed, is now to be heated until the fluid that is to be inspissated begins to boil, which is known by inspection through a window in the apparatus, made by fastening on air-tight a piece of very strong glass; and the temperature, at which the boiling is kept up, is determined by a thermometer. Ebullition is continued until the fluid is inspissated to the proper degree of consistence, which also is tolerably judged of by its appearance through the glass window. I prefer taking for a single operation, as much juice or infusion as will keep the apparatus employed for nearly the whole day. When inspissated sufficiently*, the residuum, which we denominate extract, is taken out and is fit for use.

On comparing the temperature employed for ebullition in vacuo with that generally in use, we are led to expect a considerable difference in the sensible qualities of extracts. With some this is the case in a very striking degree. The extract of hemlock is an example; its taste and smell are remarkably different, as is the colour both of the soluble and feculent parts; it also possesses an extraordinary degree of tenacity, a property which is not generally found in the common extract; and it abounds so much with crystallized matter as to produce a gritty sensation when rubbed between the fingers. The extract of belladonna contains a large quantity of crystals of some kind of salt; but I have not succeeded in procuring either of these in a separate state, so as to give them an examination. In some attempts to obtain them pure, and more particularly to discover whether morphia (the new vegetable alkali) was traceable in the narcotic extracts, I became acquainted with the singular fact, that phosphoric acid in a soluble state is to be found in all the extracts. On further extending the investigation, it was ascertained that this acid, besides that portion of it which exists as phosphate of lime, is contained in a vast variety of vegetables. It would be rather foreign to the subject of this paper to enumerate the substances that were tried, but I may just mention that all those vegetables which are cultivated seem to contain phosphoric salt in great abundance.

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* It frequently happens that the extract has become too stiff; but this is easily remedied by gently warming it, and kneading it with sufficient water.

The extract of taraxacum is another remarkable instance of the difference in the sensible qualities of these preparations; instead of being sweet to the taste and high-coloured, like that prepared in the common way, it is bitter and extremely pale when fresh made; its taste much resembles that of the plant itself. With respect to the strength of extracts made in vacuo, I have not yet gained sufficient information to be able to present a view of the relative proportions which they bear to the common extracts; but I have been informed by several medical friends, who have given them a trial, that they find them materially stronger*. Perhaps some gentlemen will consider the subject sufficiently deserving of investigation, to collect such a statement of cases as will enable them to present to the Society, the relative doses. I shall be glad to offer for the acceptance of such, specimens of any kind, which they may be inclined to make use of.

Plough Court, Lombard Street,
25th of 5th Month (*May*) 1819.

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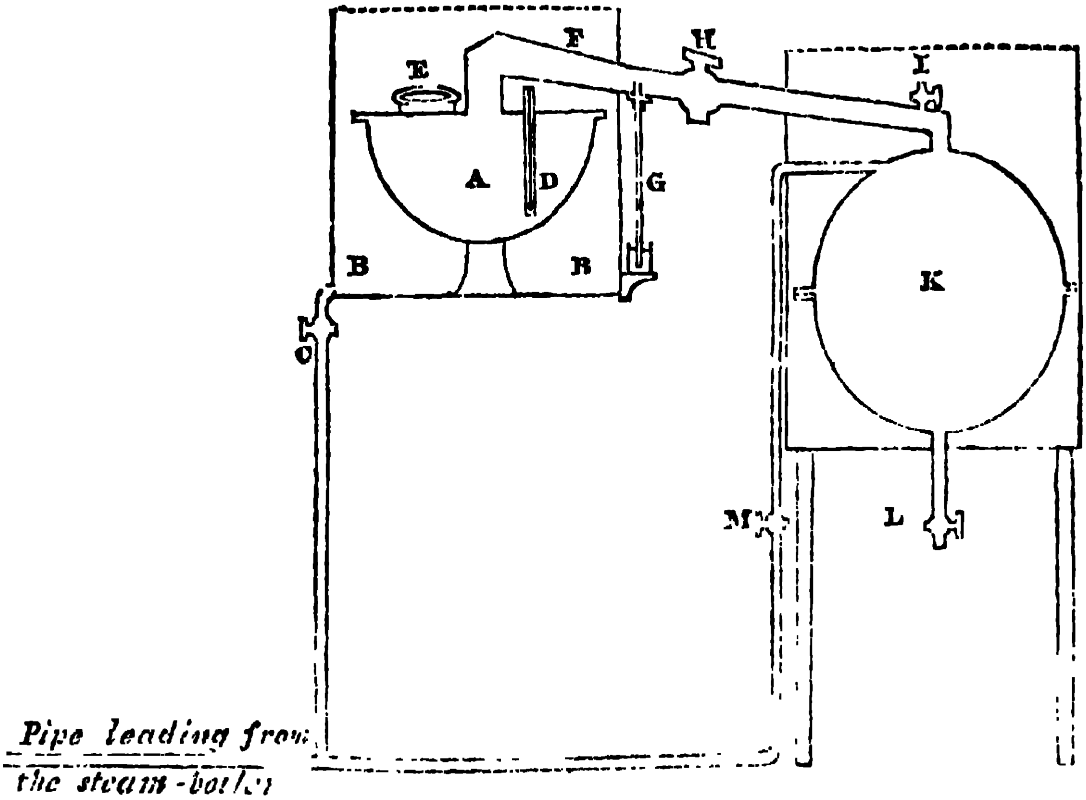
* I deem it almost indispensible to state, that the increased activity of extracts when prepared by this new method, makes it imperative on those who compound medicines to continue using the old kind, except where extracts prepared in vacuo are specially prescribed.



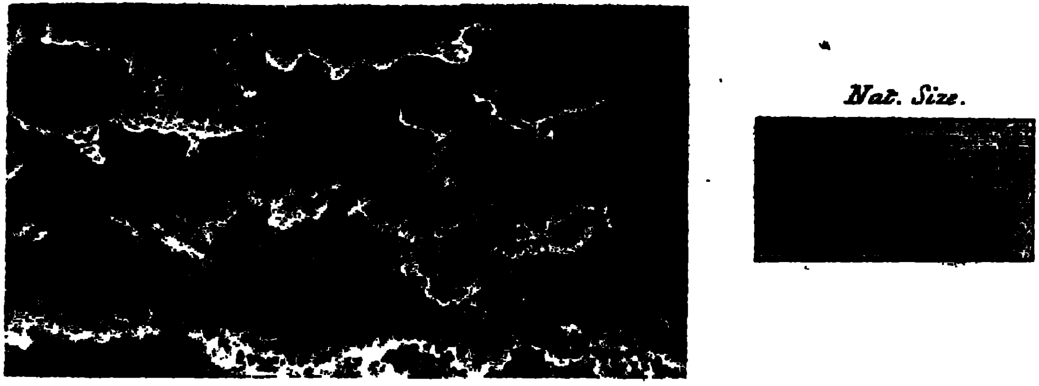
A	Iron still, or evaporating-pan.
B	Water-bath.
C	Steam-pipe to heat this bath.
D	Thermometer indicating the internal temperature.
E	One of the covers, in which is a glass aperture.
F	Pipe leading from the still to the receiver.
G	Mercurial column to measure the degree of exhaustion.
H	Stop-cock.
I	Cock for admission of air.
K	Receiver in the refrigerating vessel.
L	Cock for drawing off the condensed water.
M	Cock for admitting steam when the air is to be expelled.

London, Published by Longman, Hurst, Rees, Orme & Brown, [illegible]

PLATE V.

Appearances from Inflam^{n}.

Fig. 1.
Longitudinal Canals.



Nat. Size.

Fig. 2.
Femur.

Nat. Size.

Fig. 3.
Cranium.

Nat. Size.

REFERENCES TO THE PLATES.

Plate I. Exhibits the appearances in the colour and mode of distribution of the bloodvessels in Rheumatic Ophthalmia, referred to in MR. WARDROP's paper, page 4.

Plate II. Is illustrative of MR. BELL's paper on Diseases of the Teeth. See page 38.

Plates III. IV. and V. refer to MR. HOWSHIP's paper on the Morbid Appearances and Structure of Bones, and are explained at page 207.

END OF PART I.

EXPERIMENTS

ON A

FEW CONTROVERTED POINTS

RESPECTING THE

PHYSIOLOGY OF GENERATION.

By JAMES BLUNDELL, M.D.

LECTURER, IN CONJUNCTION WITH DR. HAIGHTON, ON PHYSIOLOGY AND MIDWIFERY, AT GUY'S HOSPITAL.

Read May 25, 1819.

AMONG the various questions which have been raised respecting the generation of animals, there is one, as yet undecided, which has not perhaps been hitherto investigated with all the care it deserves. It may be demonstrated by experiment, that, in this curious process, the male furnishes the semen, and the female the rudiments; but whether these two substances must have access to each other, in order that the young animal may be formed, is a question which still admits of dispute. It is true, indeed, that many naturalists have *asserted*, that contact is necessary; and Spallanzani has even gone so far as to demonstrate that it certainly takes place in the generation of the frog and toad. Still, however, notwithstanding the labours of physiologists hitherto, we are not, I believe, as yet in possession of any regular system of experiments, which proves that the semen must have access to the rudiments, in those forms of brute generation which most nearly resemble our own. In the present state of our knowledge, the reverse of this position seems, at least, not improbable, as the experiments of Dr. Haighton, a valued relative of mine, have shewn, that evidences of generation may be produced in the ovaries, although the semen has been excluded previously to sexual intercourse by the closure of the fallopian tube.

The principal object of the memoir, which I have now the honour of presenting to the Medico-Chirurgical Society, is to contribute some little towards the supply of this defect. In it I have endeavoured to shew, that the semen must have access to the rudiments, in order that the young animal may be produced; and yet, that generation, although these approaches are necessary for its completion, may, to a certain extent, be accomplished without them.

As the rabbit was the animal, on account of its natural aptitudes, selected for my experiments, it may be proper, perhaps, before I enter on the recital of them, to premise a few remarks on its genital system*. In the fallopian tubes, and ovaries, and, I may add, the *external* genitals of the doe, there is little, when we view the organs as they are suspended in the glass, to attract the attention of the observer. It is different, however, with the vagina and the wombs; these are so strongly contrasted with the corresponding parts of the human organs, the wombs, by their tubular form, and the vagina by its length, its laxity, and large diameter, that they cannot be overlooked.

The vagina, when full grown, is about four inches long, and so capacious that, without much stretching, it will readily admit the extremity of the fore-finger. Its size, indeed, is so considerable, that it makes an approach to that of the human vagina, and greatly exceeds the dimensions of the same canal in a moderate-sized monkey, preserved in the obstetric museum, at Guy's Hospital.

The wombs, the structure of which is scarcely less remarkable than that of the vagina, are two tubular organs, when unimpregnated, about three inches and a half long and about two lines and a half in their diameter; they are therefore, it is obvious, very unlike the human uterus, and rather resemble that of several of our domesticated animals, as the cat, for instance, the bitch, and the females of the rat and mouse tribe. These two wombs, it should be further remarked, communicate with the vagina by two distinct orifices; and they are so completely independent of each other, that the one may be removed without injury to the other, excepting a slight and superficial wound of that part where their necks lie in contact, and cohere.

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* It is scarcely necessary to remark that this description is not addressed to those who have made a study of comparative anatomy.

Both the wombs and the vagina are, in these animals, furnished with longitudinal and annular fibres of a muscular structure, similar in kind to those of the intestines, but grosser and more distinct. In addition to these, along the inner margin of the wombs, from one extremity to the other, there runs a broad strip of fleshy fibres, which may, perhaps, not improperly be denominated the mesometric. I give the muscle this name, because it covers no inconsiderable portion of what may be called the *mesometry**; a delicate double membrane, the production of the peritoneum, which performing, for the tubular wombs, the office of a mesentery, unites them, like the intestines, to the chine. It is allied to the broad ligaments of the human womb.

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* I venture on the name with diffidence, but no preferable term occurs to me; its etymology is obvious, and, I believe, legitimate and analogical.

All these fleshy fibres are animated with a very lively irritability. The mesometric muscle* changes the situation of the wombs. The wombs themselves perform a peristaltic action. The vagina not only performs this action, but an additional movement, which I shall hereafter have occasion to describe.

Such are the most striking characteristics of the genital system in the rabbit, those, at least, which the following experiments require me to notice. I may now proceed to the experiments themselves.

The first set of experiments was instituted with a view of ascertaining whether the semen and rudiments must have access to each other, in order that the young animal may be formed. For this purpose, an incision was made into the cavity of the belly, immediately above the wombs; and these, together with the upper part of the vagina, were pushed through the opening. One of the wombs was then divided near its mouth, in a transverse direction, (just as a piece of intestine might be), so as to separate it into two portions, the superior and inferior; or, as they may be designated from the annexed parts, the vaginal and fallopian. After this division the organs were immediately replaced, and the wound was sewed up.

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* Is this muscle allied in function to the round ligaments of the human womb?

Notwithstanding this violence, in the course of a few days, or a few weeks at farthest, most of the rabbits recovered their health, and at different intervals became fit for the approaches of the male. But though the general health was restored, the recovery was not complete. The operation, as subsequent dissection proved, had the effect of interrupting the canal of the womb, its tubular cavity growing up at the line of division, so that the communication between the vaginal and fallopian pieces became intercepted, and the semen and the rudiments could have no access to each other.

In this condition of the genitals, as soon as the sexual ardour was rekindled, the animals were submitted to the male; and, excepting in one or two anomalous instances, out of ten or twelve experiments, they all became pregnant from the *first* admissions. At different periods from impregnation the sexual organs were examined after death with great care and deliberation, when young animals were invariably found in the sound womb, but none in the interrupted. This, it is true, like the human uterus in extra-uterine pregnancy, was in many instances enlarged and developed and plentifully supplied with blood, indeed it often appeared as well adapted as its fellow for receiving and cherishing the rudiments; but with all its aptitudes for generation, it lay under one capital defect, its canal was interrupted; it intercepted the access of the semen to the rudiments, and without this access generation could not be accomplished.

To confirm this conclusion, the accuracy of which I doubted at the time, it was determined to submit it to the test of another train of experiments. In these it was my object, to preserve the principle of the preceding operation, the exclusion of the semen from the rudiments; and yet at the same time, to vary its circumstances as much as possible, in order to ascertain how far they had affected the result; for I need not observe, that circumstances often exert a silent and most fallacious influence over our experiments, (our negative experiments especially) to be deprecated the more, because, from its insidious nature, it is so frequently overlooked.

In this second series of experiments, therefore, instead of operating upon rabbits that were full grown, I made use of those only that were under their puberty; and instead of interrupting, as before, the canal of the *Uterus*, I interrupted that of the *Vagina*.

The vagina of the doe, it has been already observed, is at least three inches in length; so that although it is interrupted at the uterine extremity, there still remains sufficient room for the male organ. Of this peculiarity I availed myself, in conducting these experiments; and instead of cutting the uterus, I cut the vagina asunder, (near to the mouth of the womb) so as completely to interrupt its canal. In other respects the experiment was conducted as before.

This operation proved dangerous, much more so than the former; a number of the rabbits however recovered, and admitted, without repugnance, the approaches of the male. The result was decisive. Although the external genitals of these animals were turgid with blood, and the sexual excitement of some was remarkably lively; although too, in some of them, intercourse was renewed at intervals of a week or a fortnight, on the whole, as many as twenty or thirty times, not one became pregnant. Desire itself in one or two instances, seemed almost insatiable; and in the rest, though suspended by coition for a time, in the course of a few hours, or a few days at farthest, it invariably recurred.

The same general appearances were observed on dissection, in them all. The vagina, if the operation had been properly performed, was completely interrupted. In both the ovaries there were *corpora lutea.* In some cases, the wombs appeared to have undergone little change; in others, they were enlarged, and evolved as completely as in actual pregnancy; but in no one instance was there the appearance of a single *ovum,* extra-uterine or in the womb. In these, as in the preceding experiments, though in a different manner, the access of the semen to the rudiments had been intercepted, and under these circumstances, notwithstanding repeated commerce with the male, the formation of the young animal could not be accomplished.

In performing the experiments recorded in the preceding paragraphs, there are various little niceties in the mode of operating, the observance of which is necessary to ensure success. The incision which is carried through the abdominal coverings, may be made in the linea alba, and should be eight or ten lines, at least, in length, in order that the parts may be replaced with facility. It should, too, lie as close to the *symphysis pubis* as possible, that the intestines, which in this herbivorous animal are numerous and cumbersome, may not, as they are apt to do when the incision is higher, protrude at the opening. It is true, indeed, that if the incision is placed in the vicinity of the pubes, the bladder, when it is distended, will fall in the way; but if the operator possess the requisite dexterity, there is no danger of wounding it; and a gentle pressure, persevered in for a time, will occasion it to withdraw into the pelvis. It deserves remark, however, that to produce this contraction, a little perseverance is necessary; for the bladder is not, in this manner, so readily excited to contract, as from previous reasonings on its irritability, we might have been led to expect.

To close the abdominal opening, the Glover's suture will serve as well as any other; nor does the including the peritoneum in the stitches, so far as I have been able to observe, materially increase the risk of a general inflammation. Exemption from this, depends much more upon the habit of the animal, than the niceties of the wound.

And here I may be permitted to remark, in the way of digression, that from various observations* upon brutes, as well as my fellow-creatures, I cannot forbear imagining, that the risk of extensive inflammation, from local injury of the *peritoneum*, has been exaggerated, perhaps greatly. The high importance of this principle in surgery, is too obvious to require a comment; already a sufficient number of observations has been accumulated, to induce us to examine it with attention; and I may add, that it is one of those grand practical points, which ought not to be decided by a few casual facts, much less by authorities, however venerable; but, like every other principle of a solid philosophy, by various, deliberate, and unbiassed experiment and observation.

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* Operations for hernia and on the abdominal viscera of rabbits and dogs. The rabbit I suspect is very liable to spontaneous inflammation of the bowels. I have known in women the malignant ulcer of the womb penetrate into the peritoneal cavity, between the *rectum* and the *uterus*, without exciting a general inflammation of the belly.

If in performing this operation, (as in the first set of experiments,) the womb is divided, the incision should be made transversely near its mouth, in order that we may leave the fallopian piece as large as possible, for the reception of the *ova*, in case the genitals should have power to form them. It ought, too, to be carried from four to six lines into the mesometry, in order that the pieces thus liberated, and moving out of apposition with each other, may not reunite so as to form anew a continuous canal. If, on the contrary, (as in the second scheme of experiments,) the vagina is divided, a ligature should be applied to the orifice of that piece of it which remains annexed to the womb, and fastened to the margin of the external wound. This precaution ensures the escape of the thread*, and at the same time prevents the pieces of the vagina from falling into apposition, and renewing the continuity of the canal.

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* In operating upon the viscera of small animals, I have occasionally used a very slender ligature, have cut it short, and left it. In two rabbits, which had apparently recovered after the vagina had been tied in this manner, a general inflammation of the belly came on about six months afterwards, in the winter, when the health of the animals was impaired by the severity of the season. On inspection after death, it was found, that the ligature still adhered to the vagina, and it seemed to form the centre from which the inflammation had spread.

When the genitals are mature, the rabbit very frequently dies from this operation, which, in consequence of the large size of the vagina, is more violent than the former. It is better, therefore, on this account, as well as for reasons already assigned, to operate before puberty. Previously to this change the parts are comparatively small, and the interruption of the vagina does not, as we might have been led from previous reasonings to expect, prevent the subsequent developement of the sexual organs. But to return from these details.

Although it appears probable, from the preceding experiments, that the complete process of generation requires the access of the semen to the rudiments, it seems equally certain, from a variety of appearances which I noticed in the course of my experiments, that to a certain extent, though imperfectly, it may be accomplished without it. These appearances I shall now proceed to state.

In both the uterine and vaginal experiment, the womb, though it contained no fetuses, in many cases enlarged, as in extra-uterine pregnancy. Its structure too became developed; it received more copious supplies of blood; in short, it frequently seemed as well prepared as its fellow, for receiving and cherishing the rudiments*.

The ovaries, too, I may further add, although there was no genuine impregnation of them, were very obviously excited. The vesicle in different parts of them germinated; its fluids increased; the delicate covering opened; the little cavity discharged its contents, and corpora lutea formed in all their perfection. As this appearance of the *corpus luteum*, notwithstanding the interception of the semen, is of considerable importance, and may help to clear away an objection to which the experiments lie open, it becomes necessary to examine it with attention.

The corpus luteum in the rabbit, as long as it remains, is, I think, *always* marked by pretty strong characteristics, though its appearance differs considerably with its age. A mammillary projection of the ovary, an augmented vascularity, a minute cavity, which, when the luteum is cut through, recalls to mind the appearance of a printed asterisk (*), constitute the leading characteristics; and by these, I may add, it is so decisively marked, that, although the parts are on a small scale, an experienced eye may detect it at a glance.

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* It deserves notice, that, in the uterine experiments, it was generally the fallopian portion of the womb to which the semen was not applied, and not the vaginal to which it was applied, which appeared to undergo these changes in the highest degree.

Colour is of little use in distinguishing these bodies in the rabbit. The younger the *luteum* is, the more prominently the characteristics appear*.

Now, these lutea, thus characterized, were distinctly produced both in the uterine and vaginal experiments. In the uterine experiments I had an opportunity of contrasting those of the fruitful and sterile ovary with each other, and yet, after the most deliberate examination, I could not discriminate the slightest difference between them. It deserves notice, also, that in some instances they were more numerous upon the prolific, and in others upon the barren side of the genitals.

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* In giving the name of *corpus luteum* to the appearance here described, I merely adopt the nomenclature of preceding physiologists; and in stating my belief that this appearance is the result of impregnation, or, at most, of the sexual excitement when exalted to its highest pitch, I am only advancing an opinion, which is, I conceive, *as far as respects the rabbit,* confirmed by observation. I have frequently examined the ovaries of the doe, in the virgin condition, and during heat; and in one or two cases, after the animal had been under the influence of long-continued and lively desire. In the two last instances I have never found the appearances described, though I dare not, from a negative observation of this kind, deny, that, under these circumstances, their formation is possible. In the first case, on the contrary, I have invariably discovered them, and older or younger in their appearance, according as they were examined sooner or later after impregnation. There can, therefore, I apprehend, be little doubt, that these appearances occurring *in the rabbit,* are the result of conception. This fact is sufficient for my reasoning. It may, indeed, seem irreconcileable with the opinion which a veteran physiologist has formed, respecting the nature of the human corpus luteum (see Philosophical Transactions); but so long as it appears to be confirmed by observations, conformably to sound philosophy, it cannot be denied. I am far, however, from wishing rashly to impugn the opinion of Sir Everard Home. Truths once proved must be admitted, and their apparent inconsistency demonstrates our ignorance, not their incompatibility.

In these experiments, it may be further remarked, the fallopian tubes, as well as the ovaries and wombs, seemed to be excited by coition. I observed repeatedly, in those experiments in which the vagina was interrupted, that the abdomen of the doe enlarged in a few days after the sexual commerce; and that enlargement, never noticed before, and gradually decreasing* in a few weeks afterwards, if the male was excluded, might by repeated coitions be carried to a very great degree. There is now in my possession, a doe with an interrupted vagina, which has admitted the male from twenty to thirty times. In this animal, in consequence of these repeated connections, the abdomen has gradually acquired so large a size, that it considerably exceeds the bulk of mature gestation, and reminds one of the tumor of an ascitic which requires the trocar. These enlargements, I have ascertained from repeated dissections, result from the accumulation of a humor in the wombs. This humor, various in its consistency and colour, is, however, generally fluid and pale, and turbid, and always, so far as my experiments have extended, forms albuminous concretions at a temperature below boiling heat. Even in the uterine experiments, (for the preceding remarks refer to the vaginal only), the same essential appearances were observed; the wombs, in consequence of impregnation, became filled,on the sound side, with fetuses, and on the barren with the humor described.

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* It did not however subside completely.

These facts are very significant. The formation of the lutea, the developement of the wombs, and above all, the repeated accumulations of fluid there, in consequence of coition, all seem to indicate the descent of the rudimental material; and reflecting upon them, I cannot forbear imagining that the tubes were excited, that they really transferred the rudiments to the womb, and that these rudiments engendered the watery accumulations there, in the abortive attempts of generation. This notion receives some little countenance from the generation of oviparous animals; for in many of the different species referred by naturalists to this class, the rudiments may be discharged independently of preceding impregnation. The common fowl is an example of this; the frog, the toad, and a numerous tribe of fishes. This opinion, however, is merely conjectural, and I must acknowledge candidly that it is the less entitled to confidence, as it rests on a sort of accidental observation, made subordinately, perhaps with some degree of remissness, at a time when others of greater importance in the inquiry occupied a principal share of my attention. This remark I take the liberty of introducing here, as I conceive it to be the duty of every experimental inquirer *himself* to distinguish between his conjectures and demonstrations, and thus, by the exercise of a philosophical frankness, to prevent error from insinuating itself from its association with truth.

On the whole, then, it seems probable, judging from the appearances related, that generation may be carried forward to a certain extent, although the access of the semen to the rudiments is intercepted. Under these circumstances, the young animal cannot be formed, it is true; but corpora lutea may be generated; the wombs may be developed; and the rudiments, if we may judge from the facts already stated, may even be transferred to the uterine cavity by the play of the fallopian tubes.

It should be remarked, however, in dismissing this part of our subject, that these imperfect attempts at generation do not always equally occur. Corpora lutea, I believe, will be found to form invariably after sexual intercourse, if the genitals are excited at all; but in some anomalous instances, there is no consequent developement of the wombs, and in others, no accumulation of the uterine fluid. The first of these failures has occurred to me once in twelve experiments, and the last of them five times*. But these *negative* irregularities merely prove, that, under circumstances, the genitals may be more extensively excited at one time than another. They by no means invalidate the principle which it has been my endeavour to establish on positive facts, that the ovaries, tubes, and *uterus*, are capable of an imperfect excitement, even when the semen and the rudiments are kept apart from each other.

Against the experiments and reasonings advanced in the preceding pages, various objections may be urged, to which it may now be proper to advert.

And first, it may be objected that sterility is sometimes an accidental occurrence. We frequently observe it in human generation. In the experiments under consideration it would perhaps have occurred, although the interception of the semen, to which it is ascribed, had not taken place. To these objections, however, I would reply, that in the rabbit the accidental failure of impregnation is rare, and does not occur in one doe out of twenty, if the animal is in health; that the appearance of the genitals, and the behaviour of the female when the male was admitted, both of them indicated inclination and aptitude for generation; that these experiments were not solitary, but frequently repeated; and that sterility was not an accidental occurrence, in a single instance only, but an invariable result of them all. Nor must it be forgotten that the formation of the *lutea*, and the evolution of the *uterus*, are themselves sufficient proofs that the genitals were not accidentally inactive; nor that in the uterine experiment, in which the semen was intercepted on one side only, there were undeniable proofs of the generative excitement in the formation of the young animals on the other.

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* In one or two instances the orifice formed by dividing the uterus remained open in the fallopian piece. This accounts for some of the failures of uterine accumulation.

But there is another objection to which the experiments lie open, which on a cursory consideration, at least, may appear to bear with considerable weight. In these operations either the wombs or the vagina were cut asunder. It may be asserted therefore that sterility ensued, not so much in consequence of the interception of the semen, as from the debility induced, in the genitals by operative violence; the germs afterwards perishing because the soil was become unfriendly.

To this plausible objection, however, it might be sufficient to reply, that from the form of the parts the injury of the operation is merely local; that when the vagina is cut through, before puberty, the genitals suffer so little from it that they are afterwards brought to maturity in the same manner as if no operation had been performed; and that in both sets of experiments, whether uterine or vaginal, the wombs frequently become enlarged and developed, and like a fruitful and well dressed soil (to resume the figure already adopted), are brought into high condition for raising the rudiments to perfection. To obviate this objection, however, in a still more satisfactory manner, the following experiments were instituted.

I divided the vagina of two young does, just before their puberty; but instead of securing the uterine piece to the verge of the abdominal wound, I allowed it to remain in apposition with the other. In consequence of this method of operating the parts reunited; the canal of the vagina was renewed; and the sexual desires appearing a few weeks after recovery, both the rabbits became impregnated. The inference is obvious.

The second set of experiments, turning on the same principle, was executed on the wombs themselves. In these both the wombs were divided, the one in two, and the other in three places, in such a manner, however, that the incision was not carried completely across into the mesometry; so that the pieces were retained in mutual apposition, and reunited without interruption to the uterine canal.

The result of these experiments was decisive. From the very method of operating it is obvious the wombs were more roughly handled in this than in any of the preceding experiments; accordingly a larger number of the rabbits died; and yet, notwithstanding this violence, the very first doe which recovered produced no less than nine fetuses from her *first* intercourse with the male. Indeed so complete was the action of the *uterus*, that there was not one of the little masses of rudimental matter which it failed to mature; and it was found, on a careful comparison of the wombs with the ovaries, that the number of fetuses and corpora lutea was the same. To these remarks I may add, that the human womb, although it has been cut or torn, or partially destroyed by ulceration, still retains the power of maturing the rudiments. Healthy children have been born, not only after recoveries from uterine rupture and the Cesarian operation, but even at the time when the neck of the womb had been ulcerated. A case of this kind has lately fallen under my own knowledge; and others are recorded by obstetric writers.

There yet remains a third objection, which, it is conceived, may be completely obviated, though at first view it wears a very formidable aspect. The vagina of the rabbit is very long and very large; its course is not direct; the organ of the male can neither fill it nor penetrate to the orifices of the wombs;

how then can the semen be injected into the uterine cavity, even granting that it might meet the rudiments there?

This objection, felt in all its force by those who have examined the genitals merely in the preparation glass, falls at once when they are viewed in the rabbit while it is living; or, to avoid unnecessary severity, immediately after the dealer has killed it.

Both the vagina and the wombs perform a peristaltic action, the wombs somewhat obscurely, the vagina in a more lively manner, even than the intestines of the animal themselves. This canal indeed, during the heat, is never at rest; it shortens, it lengthens, it changes continually in its circular dimensions; and, when irritated especially, will sometimes contract to one third of its quiescent diameter. Now this peristaltic action, resembling the intestinal, is itself sufficient to explain the transmission of the semen*. In addition to this action, however, the vagina performs another, easily comprehended on inspection, although, as frequently happens, the verbal description of it may perhaps appear a little obscure. The action to which I here allude, consists in the falling down, as it were, of that part of the vagina which lies in the vicinity of the wombs, so that it every now and then lays itself as flatly over their orifices as we should apply the hand over the mouth, in our endeavours to stop it. So close is this application, that I have sometimes fancied I could perceive externally something resembling a little dimple, occasioned by the sinking of the surface of the vagina into the orifice of the womb. How well adapted the whole of this curious movement is for the introduction of the semen at the opening, it is needless to explain. The mere performance of it furnishes no contemptible argument in proof of that approach of the semen to the rudiments for which I have been contending.

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* There is some little reason for surmising that even the human vagina can perform a sort of peristaltic movement. Two facts have been related to me which lead to this opinion, but they are of a character too delicate for public exposure.

Before I close these observations (already perhaps too diffuse) I cannot forbear adverting to some other points of the genital physiology, which they may contribute to illustrate.

It has been asserted by some naturalists, that the corpus luteum is an evidence of genuine impregnation. It seems *certain*, however, from the facts related, that this evidence cannot be relied on; for the luteum, in these experiments, was generated under circumstances in which, as the event proved, impregnation was impossible. Indeed there seems to be little reason for doubting, that the corpus luteum may be produced, even independently of the sexual intercourse, by the mere excitement of desire in a very high degree. Mr. Saumarez has recounted experiments, in his "New System of Physiology," in which the *luteum* appears to have been generated in this very manner. I have now in my possession a preparation, (for which I stand indebted to Dr. Cholmeley and Mr. Callaway) consisting of the ovaries of a young girl, that died of chorea, under seventeen years of age, with the hymen, which nearly closed the entrance of the vagina, unbroken. In these ovaries, the corpora lutea are no fewer than four. Two of them, it must be acknowledged, are a little obscure; though an experienced eye, I conceive, would readily detect them. The remaining two are very distinct, and differ from the corpus luteum of genuine impregnation, merely from their more diminutive size, and the less extensive vascularity of the contiguous parts of the ovary. In every other respect, in colour and form, and the cavity which they contain, their appearance is perfectly natural, indeed so much so, that I occasionally circulate them in the class-room, as accurate specimens of the luteum upon the small scale.

On this point I have been the more explicit, both as the principle is of some importance in forensic medicine, and as it removes at once an objection to which these experiments lie exposed, and which is taken from those of Dr. Haighton. In these experiments, very ingenious, and extremely beautiful, my valued relative has shewn, with his usual accuracy, that the corpus luteum may form though the fallopian tube has been obliterated, in some part of its course, and the access of the semen to the rudiments therefore has been intercepted. When, however, he infers from this, in opposition to the principle asserted in this memoir, that the ovary has been impregnated, notwithstanding the interception of the semen, he certainly falls into one of those errors, from which the most wary physiologist is never absolutely exempt, for the corpus luteum is not a certain evidence of impregnation.

The appearances related, I may further remark, afford, when combined with others, a plausible proof that the semen sometimes penetrates as far as the ovaries; a point which has been much controverted.

In the varieties of human generation, we sometimes meet with extra-uterine pregnancies, in which the ovum not only lodges in the tubes, or the peritoneal cavity, but in the ovary itself. Indeed, this form of the disease seems on the whole the most common. Now, if it be true, as I have endeavoured to prove, that the young animal cannot be formed unless the semen have access to the rudiments, it is evident, that in these pregnancies, in which the fetus is generated among the graafian vesicles, the semen must have made its way up to the ovaries themselves. It must not, however, be too hastily inferred from this, that the semen always penetrates into these remote recesses of the genitals. Facts have been related, which give a shade of probability to the conjecture, that without the contact of the semen the rudiments may sometimes descend into the uterus; and certainly, although the opinion is not without its difficulties, it is not impossible that they may meet each other there*.

There is yet a third point in the physiology of generation, which the preceding experiments may contribute to elucidate. It has been contended by some naturalists, and not without show of reason, that the semen in generation is transferred to the blood-vessels; and as the purgative or emetic, when injected into the veins, exert their peculiar influences on the stomach or the bowels, so also, in their opinion, this active fluid, transmitted by the absorbents, makes its first impression on the vascular surface, and its second, by a similar sympathy, on the genitals themselves. What effects might be produced by injecting the semen directly into the veins when the genitals are in a state of excitement, I shall not venture to determine; as yet I am in possession of no decisive experiments upon the point, and it would be a mere waste of mind to speculate without them. It seems evident, however, from the facts related, that after transmission through the absorbents and their glands, the semen retains no such generative influence. It will be readily conceded, that when a rabbit admits a large male, in vigorous health, and in the flower of its age, as many as twenty or thirty times, a large quantity of the genital fluid must be imbibed by the absorbents of the vagina, yet neither in the uterine nor the vaginal experiment, in which these repeated coitions sometimes took place, was impregnation by absorption accomplished. The simple exclusion of the semen from the rudiments always prevented the formation of the young animal; in the vaginal experiments it was not produced at all; in the uterine it was formed on that side only where the womb remained pervious.

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* Is the transfer of the semen beyond the womb the cause of extra-uterine pregnancy?

On a review of the whole inquiry, it will, I conceive, appear not improbable that, for the completion of generation, the semen must have access to the rudiments; and yet that notwithstanding the necessity of these approaches, for its completion, the process to a certain extent may be accomplished without them. These are the two leading propositions which it has been my endeavour to establish; at the same time I have subordinately attempted further to shew, that the corpus luteum is not a proof of genuine impregnation; that the semen, at least occasionally, penetrates as far as the ovaries; and that however copiously this fluid may be absorbed into the vessels, it is incapable of giving rise, by any impression there, to the complete circle of the generative actions.

Whether these principles of brute generation may be transferred to our own, I will not venture to determine. Analogical arguments, generally the best that physiology furnishes, are, it must be admitted, never absolutely demonstrative; but as the generation of the rabbit, in its other principles, resembles that of the human female, there seems to me but little reason for supposing that there is an essential difference here.

St. Saviour's, Southwark,
June 1st, 1818.

SOME OBSERVATIONS

ON A MODE OF

PERFORMING OPERATIONS

ON

IRRITABLE PATIENTS,

WITH A CASE WHERE THE PRACTICE WAS SUCCESSFULLY EMPLOYED.

By JAMES WARDROP, Esq.

SURGEON EXTRAORDINARY TO THE PRINCE REGENT.

Read May 11, 1819.

IT is not uncommon to meet with persons who have diseases which can only be relieved by an operation, but whose minds are so irritable, that although convinced of the propriety of such a measure, yet when about to submit to it, their courage fails, and they wrest themselves from the hands of the surgeon and his assistants by a convulsive effort.

A difficulty, from another cause, occurs in infants and children, when an operation is to be performed in which any particular mechanical neatness or dexterity is necessary. The difficulty in this case can generally be overcome, by inclosing all the body, excepting the part to be operated on, either in a bag or wooden box.

But patients of the former description are not so easily managed, and examples are by no means rare, where persons have suffered severe distress or even died, from diseases which they were convinced might have been relieved by a surgical operation. I remember an officer with a tumor at the angle of the lower jaw, which he himself was anxious to have removed, but when the knife was about to touch the skin, his courage failed him. After three or four unsuccessful efforts of this kind, he determined to allow himself to be tied "hand and foot," which, after having been accomplished with some difficulty, the incision was begun, and he then became tranquil, and the operation was easily finished. But by many, a process like this would never be submitted to; and I have heard patients who had been operated on for the stone, declare, that the binding of the hands and feet was by far the most distressing part of the operation.

It therefore still remains a great desideratum in surgery, to contrive a mode by which patients of the description alluded to, can be induced to submit to operations, and, as the practice which I have adopted in the following case may be applicable under similar circumstances, it may be worth while briefly to relate it to the Society.

A young woman of a robust form had a tumor on the orbitar plate of the left frontal bone, the base of which adhered firmly to the bone, whilst the exterior portion was attached to the integuments, in which there was a small sinus leading into the interior of the tumor. The diseased mass did not exceed the bulk of an almond, but it was attended with great pain, and even cautiously touching the orifice of the sinus with a probe excited violent irritation. A tumor had been extirpated from the seat of this swelling some months previously, a portion of which adhering to the bone being left behind, gave origin to this new growth.

Though she had come from a distance determined to get the disease removed by an operation, if it was considered advisable, yet when the scalpel touched the integuments she made a violent resistance. A second attempt was made, having previously secured her on a table with numerous assistants; but such was the force and exertion she made to extricate herself whenever the operation was about to be begun, that every hope of success was abandoned.

As the only resource, it then occurred to me, that if she would allow herself to be bled to a state of deliquium, the tumor might be extirpated while she remained insensible.

After a few days she submitted to this measure, and a large vein was freely opened while she sat in the erect posture, in a very warm room, in which there were seven people, with the doors and windows kept shut to hasten her fainting. No less than fifty ounces of blood were drawn before she fainted, and then a complete state of syncope came on, which lasted a sufficient time to allow the tumor to be removed.

With the assistance of Mr. Young, the operation was accomplished with great facility; and in order to produce an exfoliation of the diseased portion of bone, its surface was rubbed over with kali purum. When the fainting went off, she would not believe that the operation had been performed, until she examined her face in a glass.

She suffered little from the effects of the operation, and though she remained pale and feeble for a few days, from the profuse bleeding, yet in a week, she was better than most patients are, who have undergone so severe an operation; and she rapidly recovered her wonted strength without in any way appearing to have suffered from the loss of blood.

The quantity of blood which was in this instance drawn, may to some appear enormous, but I was emboldened to proceed to that extent, from having almost universally observed, that those patients recovered operations best, who lost the greatest quantity of blood; a fact strikingly illustrated after the battle of Waterloo, when it was found, that the wounded who were left in the field, and not taken into hospitals till the fourth and fifth day after the battle, recovered much sooner than those who were immediately attended to. This difference could only be accounted for, by the bleeding from the wounds being so extensive as to produce syncope; thus preventing inflammation and fever.

Nevertheless, it has not been my intention to recommend this mode of practice for general adoption. The result will shew, that, were circumstances equally urgent to suggest its employment, it may be ventured upon fearlessly.

April 28, 1819.

HISTORY
OF A
CASE
OF
BONY TUMOR
SUCCESSFULLY REMOVED FROM THE HEAD OF A FEMALE.

By ROBERT KEATE, Esq.
SURGEON TO THEIR ROYAL HIGHNESSES THE DUCHESS OF GLOUCESTER
AND THE PRINCE LEOPOLD,
AND SURGEON TO ST GEORGE'S HOSPITAL

Read June 22, 1819

I HAVE the honor to submit to the Society the history of a case of bony tumor on the head of a female, which has been successfully removed by me, and which, in the event, proved to be an enormous collection of hydatids between the two tables of the frontal bone. I am not aware that such a case is on record.

In stating the symptoms and treatment after the different operations, I may appear to have gone too much into detail; but the novelty and importance of the case will, I trust, be deemed sufficient to excuse, if not to justify, the prolixity of the account.

Maria Arnold, aged 18 years, came, in March, 1815, to consult me about a large tumor on the frontal bone, chiefly over the left orbit, but extending partially above the inner angle of the right orbit also, and occupying the greater part of the left portion of the frontal bone.

She first discovered a small hard tumor about the size of a hazel nut, six years since, towards the lower part of the bone over the left brow, which increased slowly at first, but during the last three years its growth has been more rapid, and it now assumes the shape and size of three-fourths of a large orange; the surface, however, is not quite regular.

She has felt uneasiness externally since the commencement of the swelling, attended with a sense of throbbing round the base, but till lately there have been no symptoms of internal pressure. She now feels intense headachs, with occasional vertigo, dimness of sight, nausea, and tinnitus aurium.

The tumor was evidently of bony growth; and the immediate impression on my mind was, that it was between the two tables of the frontal bone, the external table being pushed forward, causing the convex surface of the protuberance, and the internal table depressed, giving rise to the present urgent symptoms.—I gave this opinion, accordingly, to her relation who accompanied her, and recommended an operation, to attempt its removal. Finding, however, from him, that other opinions had been given, which did not accord with mine, I advised her being brought to St. George's Hospital, where she was accordingly admitted on the 31st of March.

In consultation with the other surgeons of the hospital, the same opinion predominated; and on the 3rd of April the operation was performed in the following manner:—

A crucial incision was made through the integuments covering the whole extent of the tumor; the flaps were turned back, and the bony covering of the tumor itself was exposed; it appeared very thin, and extremely vascular. It had been my intention to remove this protruding portion by sawing through the whole circumference of its base, close to the general surface of the os frontis; accordingly, by means of a large metacarpal saw, about one-third of the circumference was already divided, when, through the groove made by the saw, one of the surgeons who was assisting me, thought he perceived a pulsation, as if of the vessels of the dura mater, though this was not observed by myself. I determined, nevertheless, to detach a portion of the bone, in order to ascertain the precise nature of the tumor, before I proceeded further in sawing through the base. This was readily effected by the elevator, when a thin transparent membrane was discovered closely lining the bony case; but in breaking off this small piece of bone, the cyst was ruptured, and its contents, a thin colourless fluid, escaped; the cyst at the same time collapsing into the cavity. This cavity was carefully examined by the finger. It presented an irregular surface, or floor, lined by the membrane above described, but evidently depressed below the general or proper level of the internal table: no pulsation was now perceptible, and no orifice leading through the internal table and communicating with the meninges, was discoverable. Some more small pieces of bone were then removed, but the patient had by this time become so faint and exhausted, that it was thought prudent to discontinue the operation, hoping that the remainder of the bony case or covering might be subsequently detached, or destroyed by acids or by other means.

A little dry lint was therefore applied to the surface of the cavity, and the flaps of the scalp simply laid over it; when she was taken to bed nearly exhausted.

About four hours after the operation, I found the pulse much accelerated, and the pain of the part very severe: cold lotions relieved the pain, but in the evening it returned by violent paroxysms every ten minutes; this pain was referred to the wound itself, and to the frontal sinus, and extended to the left temple. Pulse at 9 o'clock, *p.m.* was 100; skin hot; tongue covered with a white fur; the neutral draught, with liquor antimonialis, was directed; and she had taken forty drops of laudanum soon after the operation.

4th April.—She has rested but little during the night. The pain now complained of is continued, not occurring by paroxysms. Pulse, at eight in the morning, 104; at eleven o'clock, pulse 120. Pain referred to the wound only; tongue white and furred.

Eight o'clock, *p.m.*—The bowels having acted without giving relief to the pain, and the action of the pulse being rather increased, twelve ounces of blood were taken away. The blood was buffy, and its abstraction relieved the severity of the symptoms.

5th April.—She has felt much pain, though she had dozed about four hours during the night; the bowels had acted, and she had less thirst than last night. Pulse still between 130 and 140; the wound looked well; suppuration advancing; tongue more dry; pain still referred to external parts. Eight ounces of blood were taken away in the evening, which was less buffy than that of last night.

6th April, eleven o'clock, *a. m.*—She had three or four hours' sleep during the night. Pulse 130; less fever, and rather less pain. The cavity of the tumor tightly filled with coagulum, which now begins to separate. The bowels are kept open by sulphate of magnesia added to the saline and antimonial medicine.

Eleven o'clock, *p. m.*—The heat of skin has increased, together with pain in the head; she complains also of considerable pain in the left side; the pulse is more frequent, and more full and wiry; now 150; twelve ounces more blood were taken away.

7th April, eight o'clock, *a. m.*—She has had a quieter night; pulse under 130; her tongue is not so dry, but she has still much burning pain in the tumor.

Eleven o'clock, *a. m.*—Pain in tumor still violent, as well as in the side; pulse very rapid. The blood taken away last night evinces no marks of inflammation; and the pain in the side appearing to me to be spasmodic, I gave her a large dose of æther and laudanum, which quickly relieved it.

8th April.—She had a tolerable night; pain in tumor less; complains of general pains in limbs; pain in side relieved, but not removed, by the anodyne; a blister was therefore applied, and at nine o'clock, *p. m.* she was much more easy and comfortable in every respect.

Sunday, 9th April.—She has passed a good night, and is tolerably free from pain; during the day she was alarmed by hæmorrhage from a branch of the temporal artery, which was stopped by gentle pressure. In the evening, the pain in the tumor returned, and she complained of uneasiness about the throat, and distress from cough; these were relieved by tinct camph. compos. The wound looks well, and suppuration goes on favourably.

10th April, eleven o'clock, *a. m.*—She is better this morning, though she has not slept much during the night. Pulse 110; cough better; complains of pain coming on generally over the head; skin cool; tongue moist; bowels regular.

Eleven o'clock, *p. m.*—She feels this evening [illegible] easy, quiet, and comfortable, than she has [illegible] since the operation; the wound discharges [illegible]

20th April.—From the 10th to this period she has gone on well; pieces of bone have been removed from day to day, and she has felt no pain.

13th May.—Kali purum has been occasionally applied to the bone to promote exfoliation, and pieces continue to be removed; the granulations, however, fill up the cavity and line the internal surface of the bone so rapidly, that it is with great difficulty kept exposed.

7th July.—The same kind of process has been going on, and the tumor is very much diminished in size.

She was now made an out-patient, but the same mode of treatment was continued.

10th September.—The caustic has been frequently applied to the granulations on the inner surface of the bone, and pieces have been occasionally removed; many parts have healed, especially on the outer side near the temple. Her health has been generally good, and she has been free from pain, except that occasioned by the caustic. On the left side of the wound, where the surface had healed very quickly after the operation, a small puffy tumor appeared about a month after she quitted the hospital, which I considered to be a part of the original cyst filling again; a small portion of its surface has been destroyed by the contact of the kali purum applied to the neighbouring granulations and bone, but no sensible increase or diminution has lately taken place in it.

On the evening of the 13th September she was seized with rigor and subsequent hot fit; pain in the wound and left side of head and face, with erysipelatous suffusion and tumefaction. With these symptoms continuing, she was this day (16th September), re-admitted into the hospital. Pulse 126. By gentle purgatives, diaphoretics, and other usual remedies, she soon recovered, and left the hospital in good health. The kali purum was discontinued from this time, and we determined to let the wound heal, (which was rapidly effected) and to watch the event.

January, 1817.—The puffy tumor above-mentioned has gradually increased in size, and it is now nearly as large as the original tumor. Whenever it becomes very tense, the membrane and thin cuticle give way, and the contents (the same sort of thin limpid fluid that was originally discharged) are evacuated, when the cyst collapses, the opening heals, and the tumor fills again, and the same process goes on. This has been the case for two or three months; but as she has never had a return of pain or of the distressing symptoms which demanded the original operation, she is averse to the trial of any farther means for its removal.

February 10.—The tumor or cyst, which, as stated above, has occasionally given way and discharged its limpid contents since she left the hospital in July, 1816, has now increased to a great extent, and protrudes beyond the limits of its former bony covering; the bony base, even of the tumor, is elevated where it was originally removed by the saw to the level of the surrounding bone; and the general circumference of the base is evidently enlarged.

She has lately also felt more pain in the tumor and in the left temple; her health, too, has been slightly affected, particularly in the recurrence of pain in the side, with disordered stomach and bowels; the pulse is quick and weak, and the tongue white.

Under these circumstances she was this day, February 10th, re-admitted into the hospital.

By attention to the constitutional symptoms the health was soon restored. In the mean time, on 12th February I punctured the cyst, and about four ounces of a clear straw-coloured fluid escaped; the cyst collapsed, but under it there appeared to be a soft tumor filling the cavity within the bony prominence; this gave me some apprehensions as to the nature of the disease, but I determined to make a larger opening when the cyst should again be filled; accordingly, on the 17th, I applied kali purum to the tense surface of the tumor.

21st February.—The contents of the tumor, nearly four ounces, have been this day evacuated from the opening made by the caustic; and a membranous bag, evidently an hydatid, though unluckily ruptured, has come away with the discharge. This appearance of an hydatid gave me confidence as to the mode of treatment, and I repeated the application of the kali purum till the whole covering of the tumor was destroyed. This disclosed a number of separate cysts lining the cavity; and to these the caustic was freely and constantly applied from February to June, as well as to the granulations lining the inner surface of the remaining upper plate of bone. Nitric acid, sulphas cupri, and other escharotics, have also been applied; but the cysts are slowly destroyed, or rapidly reproduced, and the bone exfoliates but slowly.

In consultation on the 25th of June, it was determined to try the actual cautery, which was applied, on the 27th, to the inner surface of the cavity, and of the elevated bony plate. To avoid the alarm, however, which the red-hot iron was calculated to produce, it was used at the temperature only of boiling water. This application gave her intense pain, not only in the tumor, but over the head generally, and which continued so as to destroy her rest for two nights, producing also accelerated pulse, hot skin, great thirst, and disordered bowels.

29th June.—The cautery not having produced, on the parts to which it was applied, any better effect than the kali purum, the latter was resumed and continued to the 23rd August, when her health began again to suffer, and she left the hospital for change of air on the 3rd September; up to which period about twenty-eight hydatids had been destroyed.

In the beginning of October she again became an in-patient, being anxious to persevere in the plan, which seemed to be destroying, though tardily, the disease under which she had so long suffered.

The kali purum having been so slow in its effects, I determined to try, with caution, the arsenical caustic; which was accordingly applied on the 8th of October. A very large and deep slough was produced by this application, which appeared to remove the greater part of the remaining hydatids. There were still, however, imperfect cysts, particularly at the outer part of the tumor near the left temple, and at the upper part of its base, to which, emboldened by the success of the first trial, I again, on the 21st, applied the arsenical caustic. On the evening of this day she was seized with rigors and vomiting, which lasted during the night: but after taking effervescing neutral draughts, with potassæ sulphuretum, these symptoms subsided during the day of the 22nd. They returned again in the evening, and yielded to the same treatment; after which they did not recur; the ejected contents of the stomach were of a very bright green colour.

28th October.—The slough, from the arsenical caustic of the 21st, separated this day from nearly the whole internal surface of the cavity, leaving only two distinct cysts visible at the lower and anterior part just over each frontal sinus. I passed a probe into each; the cavity was trifling, and did not penetrate the sinus; but on pressing the bottom of the left cavity, she felt acute pain in the eye of that side.

30th October.—She has for the last two or three days suffered severe pain in the head, particularly a sense of tightness across the forehead, and pain in the globes of the eyes. Leeches freely applied, and frequently repeated, removed these symptoms.

25th November.—The arsenical caustic has not been ventured on since the 21st October; but as her health improved, the cysts have been touched with kali purum, argenti nitras, cupri sulphas, &c. and a small portion of bone has exfoliated. Some new appearances of hydatids, however, have shewn themselves on the upper and left side of the tumor.

She complains so much of the continual pains inflicted by these severe applications, although she has borne them all with exemplary patience and fortitude, that she has at length assented to my proposal, again to cut down upon the bone externally, in order to remove the whole remaining eminence by the saw. The proposed operation was performed on the 5th December, 1817.

The integuments were turned back from the outer surface of the prominence, and the base was laid bare through its whole circumference. The lower portion was first removed by a strong metacarpal saw, and subsequently the upper portion; so that the whole prominent bony ring was sawn through close to the sound and healthy surface of the surrounding bone; the largest diameter of the base thus cut through by the saw was four inches and a half; the smallest diameter, four inches.

In the very hard and compact bony substance forming the base of this extraordinary tumor, were found five or six cells containing hydatid cysts. Three of these cells in the upper part of the base were divided by the saw through their centres, and two or three in the lower portion of the base; so that the inferior sections of the cells or cavities were left as depressions in the surface, lined with corresponding portions of the cysts; these cysts were carefully removed, and the bone exposed. The original large cavity, which had formed the centre and greater mass of the tumor, from whence there had been such a rapid and inveterate growth of hydatids, was also denuded throughout of its cysts and granulations, and the inner table of the cranium entirely exposed. A large cell over the frontal sinus was similarly treated; and lint, impregnated with a strong solution of sulphate of copper, was applied to the whole of the denuded surfaces.

16th December.—Notwithstanding the repeated applications of this lint, healthy granulations have risen from the whole surface of the exposed inner table. The cells in the compact bony texture of the base have been rubbed with nitrate of silver, as well as sulphate of copper; their surfaces are still exposed, and exfoliations will apparent place.

It had been necessary, on the 13th December, to apply a dozen leeches to the temples, for the relief of pain in the head, and a sense of pressure over the temples; and, on the 24th, the leeches were repeated. No other untoward symptoms occurred, except a great disposition to diarrhœa. The granulations were very healthy, and were rapidly filling up the larger cavity; she was able to walk about, and cicatrization had commenced, when, on the 26th January, 1818, she was seized with rigors, pain in the chest, cough, and every other indication of a severe inflammatory attack of the lungs. She immediately lost twenty-four ounces of blood, and ten ounces more in the evening; had a blister applied to the chest, and proper medicines directed by the physicians; on the following day the bleeding was obliged to be repeated to twelve ounces. On the 28th, she was better; but some pain of the chest and fulness of pulse remaining, she was again bled to ten ounces, and the blister was repeated.

31st January.—She has been gradually improving, and the pain has been decreasing since the

28th; but the bleeding was repeated, for the fifth time, last night, on account of increased heat of skin and rapidity of pulse, though the pain of the chest was but little augmented.

This attack confined her to bed for about three weeks; and during this time, the secretion from the wound, and the growth of granulations nearly ceased, while cicatrization proceeded rapidly over the general surface, except where the bone was exposed and destroyed by caustics, from whence small exfoliations were from time to time taking place. The cavity is therefore greater than, from the previous growth of granulations, we had reason to expect.

On the 7th March, 1818, she left the hospital for the last time, in a very delicate state of health. During the last fortnight she had one or two severe attacks of pain in the left temple, which yielded, as usual, to leeches and a purgative. She had another similar attack a few days after she left the hospital, for which the leeches were again applied.

From this time to the 5th April, she went on well, gaining health and strength, and the wound healing every where but over the exposed pieces of bone, which were in process of exfoliating. The weather had for some days been very cold, with north-east winds, to which she had imprudently exposed herself; and on this day, 5th April, she was seized with rigors, fainting, excruciating pain in the chest, and palpitation of the heart; in short, with all the symptoms of carditis. The violence of these symptoms was somewhat relieved by the immediate loss of twenty ounces of blood, with a large blister on the chest, and the medicines prescribed by her medical attendant (Mr. Freeman, of Spring Gardens), before I was sent for. Dr. Chambers, under whose occasional medical care she had been while in the hospital, was obliging enough to visit her with me at her own residence, and the repetition of copious bleedings, blisters, and the proper medicines, restored her, after some days, to a state of convalescence. She was obliged, however, to lose 12 ounces of blood so late as the 2nd May; since that period she continued to improve in health, and went soon afterwards into the country, where bits of bone have occasionally exfoliated, till at length the whole wound is healed, and her health greatly restored, as I have learnt by a letter from her uncle, in which he says,—" It is with " much pleasure I inform you, that Maria's head is " quite healed, and her general health greatly im- " proved. Several pieces of bone came away be- " fore it healed. She will come to town the early " part of next month.

" I am, &c.

E. ARNOLD.

21, *New Street, Spring Gardens,*
September 26th, 1818 "

I have a cast of the head and tumor taken previously to the first operation on the 3rd of April, 1815, and one taken subsequently, at the time of her quitting the hospital in July, 1815.

Maria Arnold came to town in perfect health on the 22nd October.

October 30*th,* 1818.

P.S.—20th February.—I have again seen her this day; she remains quite well, and the appearance of the head is more natural and favourable than when the last sketch was taken.

SOME ACCOUNT OF A CASE
of
OBSTINATE VOMITING,
IN WHICH
AN ATTEMPT WAS MADE
TO PROLONG LIFE,
BY THE
INJECTION OF BLOOD INTO THE VEINS.

By JAMES BLUNDELL, M.D.

LECTURER, IN CONJUNCTION WITH DR. HAIGHTON, ON PHYSIOLOGY
AND MIDWIFERY, AT GUY'S HOSPITAL.

Read Dec. 22, 1818.

IN a former Paper, which was read before the Medical Chirurgical Society in the Spring of the present year, (1818) I ventured, on the authority of the experiments there related, to recommend, in cases of desperate inanition, the injection of blood by the syringe. Since these experiments were published, the operation has been already once performed; and as a narration of the circumstances may, perhaps, be of service to some, who, at this moment, may stand in need of the remedy, I hasten to lay them before the Society.

A poor fellow*, of the name of Brazier, between thirty and forty years of age, lately a patient in Guy's Hospital, was attacked with disease about the stomach, which, as subsequent dissection proved, depended upon a scirrhosity of the pylorus. It would be impertinent to my present purpose to enter into a detailed account of the various symptoms of his long illness; it may be remarked, however, that for the last few weeks, his bowels were seldom open without the use of injections, and that during the last three or four months, he had vomited the greater part of his food. The region of the stomach was frequently examined, but though he was emaciated in a high degree, neither tenderness, nor enlargement, nor hardness could be distinguished; he had no pain there, and there was nothing in the appearance of the matter vomited, which indicated ulceration: so that on the whole there was some little ground for hoping that the symptoms might, perhaps, not arise from a scirrhosity of the pylorus.

When I saw this man at the request of Dr.

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* Should this history appear prolix, the Society will have the goodness to remember, that in our total ignorance of the operation, every fact becomes important.

———————————————— *Audi!*

Nulla unquam de vitâ hominum cunctatio longa est.

Human life is at stake; and surely the infirm may, under such circumstances, reasonably exact from the profession, those minute investigations for their safety, which the sternest of the satirists has vindicated to a slave.

Cholmely, under whose care he was; the defect of sanguification had so completely exhausted him, that his dissolution was hourly expected. The veins of the limbs, I mean their trunks, were evidently shrunk; the pulse was small, and feeble, and very compressible, and so indistinct, that it could not be numbered without some difficulty; the vascular system seemed nearly empty. With these marks of inanition, the other symptoms corresponded. The temperature of the limbs was falling, and the mind sinking into a state of insensibility; the muscles were become so feeble that he spoke in whispers, and found a difficulty even in stirring his limbs; and his whole person, the limbs and face especially, was so excessively emaciated, that when he lay in the bed, so that only the face and arms were exposed, he really reminded one of an animated human skeleton, covered merely by the skin. I am aware that this figure may appear a little too fanciful, but it certainly conveys no exaggerated idea of the appearance which it is designed to illustrate. To these remarks I may add, that the complexion was slightly jaundiced, and that the skin, on various parts of the limbs especially, was discoloured, with mottled patches of a livid blue tint, which seemed rather to arise from a gathering of blood in the minuter veins, than from actual extravasation.

When it was first proposed to me by Dr. Cholmely, that the injection of blood should be tried in this instance, as the "only and doubtful" remedy, I felt considerable hesitation. The case was every way unfavourable, at least to the splendid success of the operation; and I could not but think it unwise, by an adventurous attempt to prolong the life of a solitary individual, to risk the character of a remedy, which, if adopted into practice, would hereafter, in all probability, preserve the lives of numbers. On seeing the patient, however, my reluctance presently gave way; his truly helpless and hopeless appearance was such as might have moved compassion, even in those who are most familiar with disease. He was evidently at the point of death. Transfusion alone could give him a chance of life. He was himself willing that the attempt should be made. Even if the operation should fail, it would probably disclose facts which might be of advantage to others. These were weighty considerations, and we determined to operate*.

For this purpose, about an inch of the right cephalic vein was laid bare, a little above the elbow, (for the vessels were too much contracted to admit of the operation below it,) and a longitudinal incision, about a line in length, was made with the lancet. Some gentlemen present, undertaking to supply a few ounces of blood, about an ounce and a half was taken up by the syringe, and immediately infused into the vein in a gradual stream. This operation was repeated ten times, so that between twelve and fourteen ounces of blood were introduced, in this manner, in the course of thirty or forty minutes.

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* Dr. Cholmely, Dr. Back, Dr. Wright, Mr. James South, Mr. Callaway, Mr. John South, Mr. Thomas Cox, Mr. Pollard, and several other gentlemen, were present at the operation.

No very obvious changes, either morbid, or of a salutary nature, made their appearance during the operation. The brain, nerves, and muscles, remained undisturbed; the respiration continued unaltered; the temperature of the body scarcely rose; and even the pulse, with the exception of a slight increase in its size, and a dubious variation of three or four beats in the minute, underwent no obvious change. It should be observed, however, that the livid discolouration of the hands, already described, gave way to a more healthy complexion; the same change, though unattended to, probably taking place on other parts of the skin. In reply to repeated inquiries, the patient himself declared, that he perceived no unusual sensation whatever; and at the close of the operation, when speaking doubtfully of his improvement, he expressed himself in a more audible whisper than he had made use of before.

In performing the injections, some little niceties were attended to, which it may not be improper to notice. The different portions of blood were not injected in immediate succession, but at irregular intervals of five or six minutes, so as to give time for each portion to be distributed over the vascular system, before a fresh supply was poured in. In one instance, however, two measures, in another three were thrown in, at intervals of a few seconds only, in such a manner, that from three to five ounces of blood were infused, in the course of two or three minutes, yet without occasioning any obvious derangement.

To facilitate the operation, the vein was laid bare, and a probe was passed beneath it at the under extremity. As this was a first attempt, it was expected that various embarrassing circumstances might occur; and it was therefore deemed a prudent, though perhaps not altogether a necessary precaution, to obviate those, at least, which might arise from the concealment of the vein.

The little pipe, easily introduced, was secured in the vessel, without the assistance of a ligature, merely by the pressure of the finger; and in order to expel the air, it was, previously to its insertion, filled with water; retained there, on familiar principles, by placing the tip of the finger over the superior orifice*.

The syringe and the tubule formed together the whole of the apparatus; and the nozzle of the syringe, sliding readily over the smooth extremity of the tube, they could be separated or united without any difficulty. This greatly simplified the operation; for the blood was taken up from the cup, and poured into the vein, with as much ease and much in the same manner too, as the anatomist infuses his injection. Two minutes scarcely elapsed during this transfer of the blood from one arm to the other.

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* This piece of sleight was suggested by Mr. Henry Cline, and answered so well, on repeated trials, that I think it worth notice. The exclusion of air from the apparatus is important.

It is scarcely necessary to add, that the syringe was made warm;* that the apparatus was air-tight; and that the greatest care was taken, that none of the air should make its way into the veins by finding a lodgment in the syringe or pipe.

The performance of the whole operation was materially assisted by Mr. Henry Cline; and though I am conscious, that his talents are too well appreciated by the profession, to require any eulogy from me, I cannot forbear expressing the pleasure which I feel on this occasion, in associating my name with his. To his instructions I stand indebted for some of my earliest surgical information, and in him I view with respect, the union of an extensive knowledge of established surgery, with that chastened and well balanced spirit of caution and enterprise which is of all others the best fitted to improve it. I could enlarge, but I forbear; the language of panegyric would be here misplaced. What I have said he will pardon, as the well-earned tribute of unfeigned esteem, as far removed from the selfishness, as it is from the satire of adulatory commendation.

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* Is not the blood animated? And if so, would not a cool apparatus be preferable, as tending less to exhaust the vital principle? Blood in a cup coagulates more speedily at a higher than at a low temperature. Experiment must decide this question.

Although the operation, which was performed two or three hours after mid-day, produced very little effect at the time; in the course of the evening, the patient experienced a very salutary change from it. His body became warmer; his respiration remained regular; and his pulse, which by this time had acquired nearly double its former size, beat with great regularity about eighty-eight times in a minute. This was its number before the operation was performed. While I was making these observations, I was very well pleased to hear one of the hospital attendants pointing out a reddening of the extremity of the nose, and the increasing ruddiness of the lips, (pallid and bloodless before,) as well as the greater alacrity which our patient manifested, when he attempted to stir his limbs. When asked respecting his feelings, the poor fellow himself replied, "I am better," "much better;" "less fainty;" and these words were certainly pronounced with a firmer utterance, and in a louder whisper, than I had heard him use before.

All these favourable symptoms continued during the night, and the greater part of the next (the second,) day; indeed at eight in the morning, he thought himself stronger than on the evening preceding. At this time, his limbs, as well as the trunk, were remarkably, though perhaps not preternaturally, warm; he passed a stool without an injection, and felt a degree of appetite, which he had not experienced for two or three weeks before; for he pressed his attendants to supply him with a little food, and drank, at intervals, about half a pint of porter. On the whole, the symptoms seemed to indicate a slight degree of excitement. Probably this excitement was analogous to that, which arises from taking food after long-continued fasting; the blood irritating the empty vessels, on much the same principle, as the aliment does the famished stomach.

It was not till the evening of this day, (the 27th of September,) that he began to droop; but he sank so rapidly in the course of the night, that, on the following morning, he seemed reduced to as low an ebb as before the operation. As the day (the third) went forward, he passed an involuntary stool, and suffered a recurrence of his retchings. At nine in the evening, his extremities were become cool; his pulse was disposed to intermit, and his mind (perhaps) to waver; and these symptoms gradually increasing upon him, he died at eleven o'clock, about fifty-six hours after the injection, apparently exhausted from inanition.

It deserves particular remark, that although all the marks of exhaustion, which had preceded the operation, recurred on this day; not a single additional symptom made its appearance with the exception of a sort of white exudation, observed on the skin of the face, and giving it the appearance of having been dusted with a few grains of coarse powder. This efflorescence, seemingly emitted with the perspiration, was in all probability of a saline nature; but owing to some misunderstanding on the part of the attendants, none of it was preserved for chemical examination.

On the morning after death, the body was examined by Mr. Callaway. From this inspection, it appeared that the *pylorus* was really scirrhous, together with the upper part of the duodenum, and that this indurated mass made a slight pressure upon the gall-ducts. Here too the passage for the food was contracted, and its inner surface irregular, though it did not appear that even the internal membrane itself had been destroyed by ulceration.

The vein on which the operation had been performed, was of course examined with peculiar care, to ascertain whether inflammation of it had been excited. The only unusual appearance observed, however, was a darkish red discolouration of the inner membrane, for about half an inch above, and a line or two below the wound. This was seated beneath the surface of the vessel, and, at first glance, looked like the stain of a coagulum which had formed in this part of it. There was no thickening of the coats of the vein, no effusion of adhesive matter, no appearance whatever of a widely spreading inflammation; above and below the spot, the vessel appeared perfectly healthy, as it still does in the preparation of it now before me. If there had been any genuine inflammation at all, it certainly had been slight, and was confined to the vicinity of the wound.

Remarks.

There are various reflections which suggest themselves on considering this case, some of which I may be permitted to notice.

1. It will be observed, in the first place, that this poor fellow fell a victim to exhaustion, notwithstanding the supply of blood which he had received, about fifty-six hours before. When we are considering this fact, however, it must not be forgotten, that the quantity of the injection was very small in comparison with the high degree of inanition. It is wonderful what large quantities of blood may be lost, without immediate danger to life, provided the blood-vessels have time to accommodate themselves to the evacuation. Repeated venesections afford us a familiar instance of this, as well as bleedings from the womb,

I am indebted to Mr. Lewis Hensley, formerly a student at the united hospitals, for an authentic and extremely intelligent account of two cases of copious blood-letting, which it may be proper to notice here. The patients were two robust countrymen, of the middle size, and laboured under thoracic inflammation. From each of these men, Mr. Hensley *himself*, drew off by venesection, more than a gallon and a half of blood, (he weighed it *carefully*,) in the course of five days; and during the whole of this time they took little aliment besides barley-water; yet both eventually recovered, without any alarming symptoms of inanition. Brazier was a man but little below the middle size. In his case the waste of the blood had been very gradual; and at the time when we operated it had been carried to the highest pitch compatible with the remains of life. Under these circumstances, I believe a gallon and a half to be the lowest estimate of the deficiency. Indeed, when the extreme emaciation of the patient, and the contraction of the vascular system are considered, together with the gradual manner in which the blood had been wasted away, we shall not, perhaps, appear guilty of exaggeration in rating it much higher; possibly it more nearly amounted to two gallons than one and a half. But even if we take the lowest estimate, twelve or fourteen ounces will appear a very inadequate supply; nor is it to be wondered at, that, after a great part even of this small pittance had been consumed for nutrition, in the course of the next twenty-four hours, the patient should relapse into that state of inanition from which the operation had so imperfectly liberated him.

In alluding to the causes of this exhaustion, I have said little, it will be observed, of the excitement which occurred the day after the operation, because, although this was so inconsiderable as to be in a manner dubious, its effects in contributing to wear out the little remains of the patient's strength, are too obvious to require a comment.

2. The foregoing reflections naturally lead us to inquire, whether the life of our patient would not have been further prolonged if a larger quantity of blood had been infused at first, or if the injection had been early repeated, for instance, on the second day? Upon this point there may now be room for a difference of opinion; but it must, I conceive, be admitted, that with the information which we possessed at the time of the injection, the method of operating adopted was upon the whole the most prudent.

It is hardly necessary to remark, that it would have been very unwise to have thrown a large quantity of blood (for example two or three pints of it) into the veins at once. The patient was exhausted; the heart and vessels were feeble; their capacity was become contracted; we had no former experience of the effects of the operation; unexpected and fatal symptoms might, perhaps, have been occasioned by it.

Nor can we deny, that it would have been scarcely less imprudent to have repeated the operation upon the second day. In the memoir already alluded to, I have taken occasion to shew that dogs, resuscitated by transfusion, may, under certain circumstances, die a day or two afterwards*. With this fact before us, it seemed a necessary precaution that we should defer the second injection till the third day at least. It was thus only that we could ascertain whether any symptoms prohibiting a second trial of the operation would ultimately arise from the first.

But the history of this operation has a further claim on our attention, as it elucidates some important points connected with the injection of blood.

1. In the first place it shews that the operation is very easy. A little tube and a syringe were the only novel instruments required; and although this injection was a first attempt, not a single difficulty occurred.

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* When the human blood, or that of the sheep has been substituted in large quantities for their own.

2. It further proves, at least with all the force of a solitary fact, that the infusion of human blood by the syringe is unattended with danger provided the blood be not suffered to lie at *least* above a minute in the cup. No unfavourable change was produced by the operation at the time, nor was there I think a single morbid symptom observed during the next fifty or sixty hours which could be fairly attributed to it.

3. To this I may add, that the case gives additional strength to the opinion that human blood, although transmitted through the syringe, may still retain a positive fitness for the animal purposes. In this instance it will be observed, that the strength was recruited by it; that the pulse became larger and the temperature of the body warmer. The man himself felt that he was revived; and I think the spontaneous evacuations from the bowels, and the returns of appetite especially, as they seem to have arisen from an improvement of the alimentary secretions, are further proofs of the little injury which the blood had sustained from passing the syringe. Whether, blood injected in this manner, so as to supply the vessels directly, remains so far unimpaired in its qualities that it will supersede the necessity of a supply by sanguification, the case did not enable us to ascertain, but the doctrine is plausible; there is nothing in it obviously at variance with sound reasoning, and the general tenor of the facts

related certainly gives some little countenance to it. Observation, however, and experiment, the sole basis of a solid physiology, can alone solve this problem; nor can any labour, I conceive, be ill laid out which is employed in investigating a point of such importance. And are there not at this moment many patients in our hospitals sinking under inanition, who, if the experiment were explained to them, would be grateful that it should be tried? And would not this experimental remedy secure to some of them at least the only remaining chance for life? And is there a principle in the physiology of nutrition which it is of more importance to establish? Who can tell the various diseases in the management of which it might perhaps be applied? Half the labour, laid out by Spallanzani on a single dissertation, would probably establish the affirmative; and I had almost added, that the naturalist who fairly succeeds in proving it, whether by observations on the human subject, or experiments on the brute, will be found, perhaps, hereafter, when his discovery has been matured, and applied to all the medical purposes to which it is adapted, to have conferred no inconsiderable benefit on mankind. This consideration offers a noble incentive to exertion, and cannot want its due influence over an elevated and truly benevolent mind.

St. Saviour's, Southwark,
Oct. 1*st*, 1818.

CASE OF
BRONCHOCELE,

IN WHICH

THE SUPERIOR THYROIDEAL ARTERY WAS SUCCESSFULLY TIED.

By HENRY COATES, Esq.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, AND
SURGEON OF THE SALISBURY INFIRMARY.

COMMUNICATED BY

MR. ASTLEY COOPER.

Read May 11, 1819.

AMONG the greatest improvements in modern surgery, none have exceeded, or perhaps equalled, that of the surgery of arteries. To the enterprising genius of modern surgeons are we indebted for the information which enables us to perform operations on them successfully, in cases which were formerly considered impossible, and by which many valuable lives have and will be saved.

The following case is recorded, not for any extraordinary difficulty in the operation, but in order to shew that in some cases the thyroideal arteries may be tied with advantage; not that such cases are common, nor would I state any thing to encourage the juniors of our profession in attempting this operation, unless the vessels, as in this case, be sufficiently apparent, and readily within reach.

My friend and colleague, Dr. Grove, having mentioned to me a case of an out-patient of his, of the Salisbury Infirmary, with Bronchocele, in which the tumor was pressing on the trachea, and very considerably impeding respiration, and the superior thyroideal arteries being large, and pulsating, suggested the possibility of their being tied with advantage. Elizabeth Spratt, æt. 17, was in consequence admitted an in-patient. The thyroid glands were large, and pressed on the trachea, so as to render respiration and deglutition extremely difficult: and the noise she made was so great that it might be heard at a very considerable distance. The superior thyroideal arteries were large, and pulsated strongly. Her general health was extremely good.

It was agreed, on consultation, that a ligature on the artery afforded the best chance of advantage to the patient. Accordingly, on the 29th of December, I cut down on the left superior thyroideal artery, and having dissected it from its accompanying nerve by means of a bent probe, I passed under the vessel a small round ligature, which was drawn moderately tight and tied. She passed a tolerable night. The next day she complained of headache, and there was some swelling of the neck and side of the head, with increased difficulty of swallowing, and some febrile symptoms. These, however, gave way to the abstraction of blood, and antimonial medicines; and in three days she was relieved from all unpleasant symptoms.

The ligature separated on the ninth day, and the wound was completely healed on the fourteenth day. Her breathing was much improved, and the size of the tumor reduced nearly half; and she was so materially benefited, that she was discharged on the 14th February quite well.

She was to have returned to the Infirmary should any of her unpleasant symptoms have recurred ; but I presume that the tumor has not again increased, and that she remains so well that she is unwilling to submit to any further operation.

A
STATEMENT OF FACTS

TENDING TO ESTABLISH AN ESTIMATE OF THE TRUE VALUE AND PRESENT STATE OF

VACCINATION.

By SIR GILBERT BLANE, Bart. M.D. F.R.S.

PHYSICIAN IN ORDINARY TO THE PRINCE REGENT.

Read Nov. 10, 1819.

IT is now twenty-one years since Vaccination was promulgated in the country by Dr. Jenner, and fifteen years since it began to produce a sensible effect in diminishing the mortality from Small Pox. In regard to the latter period, it is coeval with this Society; yet, though no discovery in nature nor in medicine has been more important to the interests of humanity, nor any which ever so rapidly and universally has won the assent and practical adoption of mankind, there are no notices of it on our records, except some allusions to its influence on other disorders, in our second and third volumes. As it is to be hoped that our labours will prove to posterity some of the principal sources of reference regarding the medical and chirurgical discoveries and improvements of the age; as it is one of the reproaches of the country that it has not availed itself so much as any other of the benefits of Vaccination; and as there are writers among us who still allege that the failures are so numerous that the value of the discovery is very ambiguous, it seems one of the duties of the Society to lend its aid in placing these important points in their true light.

It seems almost needless to premise, that the Small Pox is of all maladies that, which, during the last thousand years, has destroyed the largest portion of the human species, and been productive of the largest share of human misery. There is, perhaps, no disease over which medical art has less power, and this power, such as it is, has consisted more in abolishing pernicious practices than in ascertaining any positive methods of controuling its fatality, unless we except the inoculation of it with its own *virus*. But, though the beneficial effect of this on those on whom it is actually practised is undeniable, it has no tendency like Vaccination to extirpate the disease; and from the impossibility of rendering it universal, it has actually been found to add to the general mortality of Small Pox, by opening a new source of diffusion to its *virus*.

In order to bring this to the test of calculation, in order also to institute a comparison of the mortality of Small Pox as influenced by Vaccination, as well as by inoculation from itself, I have selected from the bills of mortality four periods, each of fifteen years, for the purpose of exhibiting the mortality of Small Pox in each of these series in regard to each other. These are thrown into the form of Tables, and annexed to this article.

The first series is the fifteen years immediately preceding the introduction of inoculation, that is, from 1706 to 1720, both included. Previous to this period, no account that could be depended upon regarding the Small Pox, could be derived from the bills of mortality, for down to the beginning of last century such was their imperfect construction, that Small Pox, Measles, and Flux were blended under one head. Exception may be taken against the accuracy of these bills, even in this improved state, particularly with regard to the discrimination of diseases. This objection, however, is certainly less applicable to Small Pox than any other disorder, its character being so striking as not to be mistaken by the most ignorant and careless observer.

The second series is taken at the middle of the last century, when Inoculation had made considerable progress, that is, from 1745 to 1759, both included. In comparing this with the preceding series, with regard to absolute numbers, it ought to be taken into account; that eleven parishes were added to the bills of mortality, between the years 1726 and 1745, both included: so that the progressive improvement of general salubrity ought to be estimated still higher than what is indicated by the diminished mortality, as it stands in the Tables.

The third series comprises the fifteen years previous to the introduction of Vaccination, when Inoculation had made still greater progress; that is, from 1785 to 1798, both included.

The fourth series comprises the time in which the vaccine Inoculation has been so far diffused as to produce a notable effect on the mortality of Small Pox; that is, from 1804 to 1818, both included.

The result of these computations stands as follows:—

Ratio of the Mortality of Small Pox to the total Mortality.

From 1706 to 1720, one in 12.7; that is, 78 in 1000.
From 1745 to 1759, one in 11.2; that is, 89 in 1000.
From 1785 to 1798, one in 10.6; that is, 94 in 1000.
From 1805 to 1818, one in 18.9; that is, 53 in 1000.

In all these computations, fractions are not noticed in the last column of numbers.

It appears from this statement, that the proportion of deaths from Small Pox to the total mortality, increased in the course of last century; so that Inoculation appears to have added to the mortality. It is but fair to mention, however, that this total mortality is not quite a just scale whereby to measure the relative mortality of Small Pox; for in the course of that century, the general mortality itself was greatly diminished in relation to the population. This diminution of general mortality was chiefly owing to the diminished mortality of children under two years of age, which, at the time when the account began to be kept, 1729, averaged about 9000; but at the end of the century not more than 5000; also to the decrease of fevers, and still more of fluxes. The relation of the mortality of Small Pox to the population, would therefore be a more fair criterion of its increase or decrease. In this view it might, at first sight, be thought that it had decreased; for the population of the metropolis nearly doubled in the course of the last century. But it is to be remarked, that there has been little increase of population in that portion of the metropolis which is included in the bills of mortality; the great increase having been in the parishes of Mary-le-bone and St. Pancras, which are not included in these bills. It is computed in the remarks subjoined to the last parliamentary returns of population, that the population of London, within the walls, had decreased more than three-fifths in the course of last century, from the widening of streets, the erection of public buildings, and warehouses, and, it might have been added, from the migration of mercantile families to the west end of the town. As a set-off to this, there has certainly been a great addition, in the same time, to those parishes within the bills, which stand on the verge of the metropolis, such as St. George's, Hanover Square, St. George's, Bloomsbury, Poplar, and Stepney. But the addition to the population, if any, within the bills of mortality, does not seem to be so considerable as to affect the computation. And if this is admitted, the absolute numbers of the deaths from small-pox, estimated in relation to the population, that is, exactly as they stand on the Tables, afford a fair comparative statement of the mortality in the last century, and seem to prove, that Inoculation has not added so much to it as has been alleged*.

But the truly important result from these statements consists in the clear, undeniable, and great diminution of it since the introduction of Vaccination. It appears, that in the last fifteen years, the mortality from Small Pox, in the bills of mortality, has not been much more than one-half of what it was in the two like series of years in the middle and latter end of the last century. Nor does this comprise the whole benefit derived from this discovery in the metropolis; for, besides that the sixth part of it lies without the bills, it was found, in levying the tax on burials for the last six months of 1794, that the number of unregistered deaths, chiefly those of dissenters, amounted in that half year, to 3148; and the reporter of the Parliamentary Enumeration thinks that, as besides these there were undiscovered interments, the unregistered deaths may be computed at one-third of the total mortality, that is, about 7000. (*See Abstract of the Parish Registers*, 1811, *printed by authority of Parliament, Page* 200.)

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* It was in the rural population that the effect of Inoculation in diffusing Small Pox was chiefly felt. In this situation there is much less intercourse of persons with each other than in towns, so that not only many individuals escaped from exposure to this infection during their whole life, but whole districts were known to have been exempt from it for a long series of years, before it was universally diffused by Inoculation.

Assuming, therefore, that Vaccination had not been practised the last fifteen years, and that the mortality, from Small Pox, within the bills, had in that time, that is, from 1804 to 1818, been the same as from 1784 to 1798, that is, 27,569 in place of 14,716; and assuming that there has been the same proportional diminution of deaths in the districts without the bills, and among the unregistered subjects, the account of lives saved in this metropolis by Vaccination in these fifteen years, will stand as follows:—

Within the bills of mortality .	12,853
Without the bills of mortality .	2,570
Unregistered cases	7,711
Total .	23,134

The first of these numbers is found by subtracting the amount of deaths by Small Pox, in the bills of mortality, during the practice of Vaccination, from the amount of them, during the same number of years, immediately before the discovery of Vaccination.

The second number is found by dividing the first by 5. The population of the metropolis without the bills is stated at one-sixth of the whole, which is evidently one-fifth of that within the bills.

The third number is found by dividing the sum of the two others by 2. The unregistered cases being, as before stated, one-third of the whole.

It appears, therefore, that, even under the very imperfect practice of Vaccination which has taken place in this metropolis, 23,134 lives have been saved, in the last fifteen years, according to the best computation that the *data* afford. It will be seen by an inspection of the table, that, in that time there have been great fluctuations in the number of deaths. This has been owing partly to the Small Pox Inoculation of out-patients having, by an unaccountable infatuation, been kept up at the Small Pox Hospital for several years after the virtue of Vaccination had been fully confirmed. The great number of deaths in 1805 may chiefly be referred to this cause. Since the suppression of this practice, the adoption of Vaccination, though in a degree so incomplete, in consequence of public prejudice, created by mischievous publications, has been unable to prevent a considerable, though fluctuating, mortality from Small-Pox. This mortality, though little more than one half of what it was in former times, might have been entirely saved, if Vaccination had been carried to the same extent as in many cities and whole districts on the continent of Europe, in Peru* and Ceylon.

It is now matter of irrefragable historical evidence, that Vaccination possesses powers adequate to the great end proposed by its meritorious discoverer, in his first promulgation of it in 1798, namely, the total extirpation of Small Pox. The first proof of this was at Vienna, where, in 1804, no cases occurred, except two strangers who came into the city with the disease upon them. In 1805 there did not occur a single death from it in Copenhagen†. Dr. Sacco, the indefatigable superintendant of Vaccination in Lombardy, stated, in his Annual Report, 3d January, 1808, that the Small Pox had entirely disappeared in all the large towns in that country; and that in the great city of Milan it had not appeared for several years. Dr. Odier, of Geneva, so favourably known for his high professional, scientific, and literary acquirements, testifies, that, after a vigorous perseverance in Vaccination for six years, the Small Pox had disappeared in that city and the whole surrounding district; and that, when casually introduced by strangers, it did not spread, the inhabitants not being *susceptible.* The Central Committee in Paris testify, in their Report of 1809, that the Small Pox had been extinguished at Lyons and other districts of France.

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* In the summer of 1811 the author was called to visit, professionally, Don Francisco de Salazar, who had arrived a few days before in London, on his route from Lima to Cadiz, as a deputy to the Spanish Cortes. He informed me, that Vaccination had been practised with so much energy and success in Lima, that, for the last twelve months there had occurred, not only no death from, but no case of, Small Pox; that the new-born children of all ranks are carried as regularly to the Vaccinating House, as to the font of baptism; that the Small Pox is entirely extinguished all over Peru; nearly so in Chili; and that there has been no compulsory interference on the part of the government to promote Vaccination.

† See Pfaft neuen nord v. Archiv. B. I.

These are selected as some of the earliest proofs of the extirpating power. But it is demonstrable, that if at the first moment of this singular discovery, at any moment since, at the present or any future moment, mankind were sufficiently wise and decided to vaccinate the whole of the human species who have not gone through the Small Pox, this most loathsome and afflicting of all the scourges of humanity, would instantaneously, and for ever, be banished from the earth.

It is farther manifest, that extirpation being the sole and ultimate aim of this discovery, and there being the fullest historical and practical evidence of its being capable of accomplishing this end, all other questions with regard to its expediency must be futile and irrelevant. It is in the nature of all morbid phenomena, to be liable to exception. One of the most essential and characteristic laws of Small Pox itself, namely, that of its affecting the human subject but once in life, is found in rare cases to be violated. It is, therefore, perfectly conformable to analogy, and naturally to be expected, that it may not in all cases be a complete security against Small Pox. But it is obvious, that, admitting these exceptions to be very frequent, much more so than the recurrence of Small Pox after Small Pox, this can constitute no objection to the practice, as long as the extirpating power remains unimpaired and unimpeached. Nay, it is obviously so far from an objection, that it ought to operate as a powerful additional incentive on every benevolent mind, to push Vaccination to the utmost, as rapidly as possible, in order that those who are still susceptible, either from peculiar natural constitution, or from the unskilful manner of conducting the operation, or from defective matter, may not, by any possibility, catch it; for, in the event of its extirpation, it could no where be met with. And in order to stimulate the good and the wise to aim strenuously at this consummation, let it be constantly borne in mind, that the adversary they are contending with, is the greatest scourge that has ever afflicted humanity. That it is so, all history, civil and medical, proclaims: for, though the term plague carries a sound of greater horror and dismay, we should probably be within the truth, if we were to assert, that Small Pox has destroyed a hundred for every one that has perished by the plague.

It is true that in its last visitation of this metropolis, one hundred and fifty-four years ago, it carried off 70,000 victims in a few months; but since that time, the deaths from Small Pox, recorded in the bills of mortality, have amounted to more than 300,000; and a like number of the survivors have been afflicted with blindness*, deformity, scrofula, or broken constitutions, which is not the case with the Plague. And when it is considered that there are large portions of the globe, India, China, even one whole quarter of it (North and South America), besides all the tropical and arctic regions, in which it has never been known; and that in all the countries liable to it, it seldom appears but at one season of the year, and sometimes at long intervals, the ravage which it makes is trifling when compared with the unceasing havoc of Small Pox, which spares no nation in any climate, or at any season.

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* It appears, by a Report of the Hospital for the Indigent Blind, that two thirds of those who apply for relief have lost their sight by the Small Pox. It is alleged by some of the soundest Political Economists that Small Pox does not diminish the numbers of mankind, nor Vaccination increase them; for population is determined by subsistence, and the indefinite powers of procreation soon repair the ravages of disease. But, however this may be, the miseries incident to so many of those who survive Small Pox, whereby they become a burden to themselves and to society, render this disease uncontrovertibly an evil of the first magnitude, not to speak of the intense sufferings and affliction inseparable from it.

The preceding reasoning is grounded on the supposition of extirpation; but, however demonstrable the *possibility* of extirpation may be, it may not in all communities be *practicable*; and may not these alleged failures so operate, as, in such circumstances, to render the expediency of the practice questionable?

In order to decide this, let the nature and amount of these failures be ascertained and estimated.

The description of those cases of Small Pox, (if they can be called so,) which occur in vaccinated subjects, is shortly as follows. The invasion and eruption in every respect resembles that of the genuine Small Pox. I have seen it attended with high fever and a thick crowded crop of *papulæ*, such as precedes the most severe and dangerous cases of the confluent kind. This runs on till the fifth day from the eruption, both days included, at which time some of the *papulæ* begin to be converted into small sized pustules. The disorder then abruptly stops short. On the following day the fever is found to have subsided, with a shrivelling and desiccation of the eruption, and recovery proceeds without the least danger or inconvenience. The face is marked, for some time after, with brown spots, but without pits. It should never be forgotten, that all morbid *phænomena* are full of varieties and exceptions. Accordingly, though the fifth day is the most common limit of this disorder, it sometimes stops short on the third; sometimes not till the sixth or seventh; and in a very few cases, it has been known to run the common course of Small Pox. What forms the strong line of distinction from proper Small Pox, is that, with a few exceptions, it does not proceed to maturation and secondary fever, which is the only period of danger. I am not prepared to deny that death may not have occurred in a few instances, nay, there seems sufficient evidence that it actually has; but these adverse cases are so rare, as not to form the shadow of an objection to the expediency of the general practice. A few weeks ago at a meeting of this Society, at which forty members and visitors were present, I put the question whether any of these eminent and extensive practitioners had met with any fatal cases of this kind. Two gentlemen had each seen a single case, and two other gentlemen took occasion to say that they had each seen a case of second Small Pox, both of which proved fatal. It is evident, therefore, that according to that maxim which guides mankind in the conduct of life, namely, that of acting on a general rule and average, and not on exceptions, these adverse instances ought not to have the least influence on practice, even though they were much more numerous.

As it is of the utmost consequence to establish the strong and important distinction between Small Pox, properly so called, and that which takes place after Vaccination, which may be called the mitigated, or five-day Small Pox, a few of the most impressive testimonies respecting the safe nature of the latter may be here recited. Mr. Brown*, of Musselburgh, gives the detail of forty-eight cases, in none of which did the secondary fever nor death occur. Here was a saving of at least eight lives, at the lowest computation, for this is the number which by the average mortality of natural Small Pox would have died if the constitutions of these forty-eight persons had not been modified by previous Vaccination. Dr. Dewar, of Edinburgh, hearing that many vaccinated subjects had been affected with Small Pox at Cupar in Fife, where the natural Small Pox at the same time prevailed, he most laudably repaired to the spot to investigate the subject. He found that fifty-four vaccinated subjects had caught the Small Pox. All these, except one, had the mitigated or five-day eruptive fever and lived. The fatal case, was that of a child, who had a complication of other disorders, and having died on the fifth day, the Small Pox, according to its ordinary course of fatality, could not of itself be the cause of death. All the rest were safe, while of sixteen cases of the natural Small Pox at the same time and place, six died; so that if these fifty-three cases had not undergone the mitigating process of Vaccination, nineteen or twenty would have perished. Between thirty and forty cases of the same kind have occurred at Carlisle, on the testimony of Dr. Barnes, a respectable practitioner of that city*. Many proofs might be adduced from the oral testimony of private practitioners, which would over-swell this article. The only other to be mentioned is from the Report of the Central Committee of Vaccination at Paris, made in December last, in which the description of the disease occurring after Vaccination corresponds exactly with the mitigated five-day cases which have occurred in Britain. They refuse the name of Small Pox to it; but as I know from my own observation, as well as from the testimony of others, that the matter from it does by Inoculation give the Small Pox, we can hardly perhaps with propriety deny it that name; but it should be distinguished by some strong discriminating epithet, such as is suggested above.

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* See Inquiry into the Antivariolous power of Vaccination. Ed. 1809. There is an article in the Edinburgh Medical Journal by the same gentleman in 1819, in which he mentions that he had heard of several deaths having occurred from cases of Small Pox after Vaccination. But, admitting this, it is utterly incomprehensible by what process of reasoning Mr. Brown could on such premises arrive at the conclusion that Vaccination ought to be exploded and abandoned.

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* See also a clear and able exposition of this subject in the Medical and Surgical Journal of Edinburgh for July, 1818, by Mr. Dunning, of Plymouth.

Now let all this be applied to the case of a community, in which the total eradication of Small Pox is quite hopeless. Let it be admitted that such occurrences as have been described do frequently occur: let it even be admitted, for argument's sake, that every vaccinated case whatever must of necessity and unavoidably at some time or other in future life be affected with this mitigated species of Small Pox, would it not even under this great abatement be one of the greatest boons that could be conferred on humanity, as an instrument or remedy which would disarm Small Pox of its danger? The next greatest benefit to the total extirpation of Small Pox, would be the stripping it of its terrors by rendering it safe and harmless.

It may be further remarked, that the benefit derivable from the different proportions of the persons vaccinated to the total population, advances in a considerably higher progression than the simple arithmetical. It is evident that the smaller the relative number of the vaccinated, the greater their chance of meeting with Small Pox infection, and that though the disease they may catch is of a mitigated nature; it would nevertheless be desirable to avoid it on its own account, but still more on account of the prejudice it creates. This, in the eye of general benevolence, constitutes an additional, though secondary motive for extending the vaccine inoculation as widely as possible, even though the attainment of the *maximum* of total extirpation should be impracticable and hopeless.

It is of the highest importance to Society that this subject should be seen in its true light, and in all its bearings, for the frequent occurrence of these cases of Small Pox, however safe in themselves, have had a most pernicious effect on the credulous and ignorant, by giving a check to the practice of Vaccination. How many parents are there now who, from a weak distrust in the virtue of Vaccination, have to lament the loss of a child from Small Pox, either casual or inoculated? Many such are known to myself. It is pleasing, however, to observe, that though this unmerited discredit into which Vaccination had fallen swelled the number of deaths in London from Small Pox to 1051 in 1817, good sense is likely still to prevail, for last year (1818) the deaths have fallen lower than they have ever been known since the institution of the bills of mortality, the total number being only 421.

On the whole matter, I believe I am speaking the language of every man of good principles and feelings, capable of reflecting seriously and considerately on the subject, when I say that whenever he applies his mind to it, he finds some new and increasing cause of complacency and satisfaction. Viewed as a mere physical fact in the natural history of the animal kingdom, the virtue of the vaccine *virus* in resisting the action of the *variolous*, is, by its novelty and singularity, highly striking and interesting to every one whose taste leads him to take delight in contemplating and exploring the devious ways and varied forms of nature, as curious exceptions to the uniformity and constancy of her laws. But the importance of this vanishes to nothing when the unexampled benefits of it to mankind are fairly weighed; benefits which could never have been dreamt of by the most sanguine philanthropist, who, in contemplating it, finds himself lost in astonishment, at a boon to mankind almost beyond the grasp of his mind duly to appreciate. It will in the eyes of future ages be deemed an *epocha* in the destinies of the world, and one of the highest boasts of the country in which it took its rise, with a sense of unrequitable obligation to the individual who first disclosed and promulgated the secret, by drawing it from the dark recesses of rural tradition, and rendering it available to the whole human race.

Such are the sentiments which must fill every well constituted mind, and it behoves the whole medical profession, which has already done itself so much honour by the zealous and disinterested encouragement afforded to it, to continue its efforts in eradicating every remaining prejudice against it. It becomes Englishmen, in particular, to foster it, not only as the native offspring of his country, of which he has reason to be proud, but to redeem the character of the nation from the reproach of having of all others, whether savage or civilized, done the least justice to this noble discovery. There is no country which has prized it less, nor availed itself of it so little. Have we not seen it adopted instantly in Peru, in consequence of a flash of conviction from the light of evidence, and have we not seen this conviction fully justified by the immediate disappearance of Small Pox from that whole region? To those nations who may feel an envy of the glory attached to our country by this discovery, it must be no small consolation to perceive that a large proportion of the English nation has hitherto been so besotted as not to know how to appreciate nor to avail itself of it, and that it has encountered more opposition among ourselves than in all the world besides.

TABLE I.

Years.	Total Mortality.	Mortality from Small Pox.	Proportion.	Proportion to 1000.
1706	22,097	1095	1 in 20	50
1707	21,600	1078	1 : 20	50
1708	21,291	1687	1 : 12½	79
1709	21,800	1024	1 : 21	49
1710	24,620	3138	1 : 8	127
1711	19,833	915	1 : 21½	46
1712	21,198	1943	1 : 11	92
1713	21,057	1614	1 : 13	77
1714	26,569	2810	1 : 9½	106
1715	22,232	1057	1 : 21	47
1716	24,436	2427	1 : 10	100
1717	23,446	2211	1 : 10½	94
1718	26,523	1884	1 : 14	71
1719	28,347	3229	1 : 8¾	114
1720	25,454	1440	1 : 17½	56
Total—	350,503	27,552	1 : 12.7	78

In this series it appears that the deaths from Small Pox are, to the total mortality, as 1 in 12.7; that is, 78 in 1000.

TABLE II.

Years.	Total Mortality.	Mortality from Small Pox.	Proportion.	Proportion to 1000
1745	21,296	1206	1 in 17	56
1746	28,157	3236	1 : 8¾	115
1747	25,494	1380	1 : 18½	54
1748	23,869	1789	1 : 13½	75
1749	25,516	2625	1 : 9¾	103
1750	23,727	1223	1 : 19¼	52
1751	21,028	998	1 : 21	48
1752	20,485	3538	1 : 5¾	172
1753	19,276	774	1 : 25	40
1754	22,696	2359	1 : 9½	104
1755	21,917	1988	1 : 11	91
1756	20,872	1608	1 ; 13	77
1757	21,313	3296	1 : 6½	155
1758	17,576	1273	1 : 13¾	73
1759	19,604	2596	1 : 7½	132
Total—332,826		29,895	1 : 11.2	89

In this series it appears that the proportion of deaths from Small Pox is, to the total mortality, as 1 in 11.2; that is, 89 in 1000.

TABLE III.

Years.	Total Mortality.	Mortality from Small Pox.	Proportion.		Proportion to 1000.
1784	20,454	1210	1 in	17	59
1785	15,919	1999	1	9½	106
1786	20,445	1210	1	17	59
1787	19,349	2418	1	8	125
1788	19,697	1101	1	17¾	56
1789	20,749	2077	1	10	100
1790	18,038	1617	1	11¼	89
1791	18,760	1747	1	10¾	93
1792	20,315	1568	1	13	77
1793	21,749	2382	1	9	11
1794	19,241	1913	1	10	99
1795	21,179	1040	1	20¼	49
1796	19,288	3548	1	54	18
1797	17,014	512	1	33½	30
1798	18,155	2237	1	8	123
Total	293,850	26,579	1	11	90.9

In this series it appears that the proportion of deaths from Small Pox to the total mortality is 1 in 11, that is, 90.9 in 1000.

TABLE IV.

Years.	Total Mortality.	Mortality from Small Pox.	Proportion.	Proportion to 1000.
1804	17,038	622	1 in 27½	36
1805	17,565	1685	1 10½	96
1806	18,334	1297	1 14	71
1807	17,938	1158	1 15½	65
1808	19,964	1169	1 17¼	58
1809	16,680	1163	1 14¼	70
1810	19,893	1198	1 16½	60
1811	17,043	751	1 22¾	44
1812	18,295	1287	1 14¼	70
1813	17,322	898	1 19¼	52
1814	19,783	638	1 31	32
1815	19,560	725	1 27	37
1816	20,316	653	1 31¼	32
1817	19,968	1051	1 19	53
1818	19,705	421	1 47	21
Total	279,404	14,716	1 18.9	53

In this series it appears that the proportion of deaths from Small Pox to the total mortality is 1 in 18.9, that is, 53 in 1000.

ON THE

STRUCTURE

OF THE

MEMBRANOUS PART OF THE URETHRA.

By JOHN SHAW, Esq.

DEMONSTRATOR OF ANATOMY, GREAT WINDMILL STREET.

Read June 22, 1819.

AN accurate knowledge of the Structure of the Urethra and Bladder is so important to safe practice in the diseases of those parts, that I hope the Society will receive favourably the smallest addition to our knowledge on this subject.

To none are we more indebted than to Mr. Hunter, and to Sir Everard Home, for the improvement of this part of surgery, but they, and many surgeons of this country, have described the urethra as a muscular tube; and upon this assumed fact has the practice in stricture been in a great measure founded.

As I have of late years been much in the society of gentlemen who are convinced that the urethra is muscular, I have been induced to pay great attention to the subject, and to examine very particularly the facts adduced by them in proof of its muscularity.

It will perhaps diminish any appearance of presumption in my opposing the opinions of celebrated men, when I inform the Society, that besides the dissections which I have made for the subject of this paper, and the constant practice I have had in demonstrating these parts, I have during the last eight years prepared about seventy specimens of diseases of the urethra and bladder, which are now added to the collection of those diseases in Mr. Bell's museum.

In the course of my dissections, I think I have discovered a peculiar structure in the membranous part of the urethra, which, as far as I can learn, has not been noticed.

But before describing the structure to which I allude, I may perhaps be allowed to make some observations on the general anatomy of the part, as the decision on the question of the muscularity of the urethra must have much influence on our practice in the treatment of stricture.

It will only be necessary to examine that part of the urethra which is anterior to the insertion of the ejaculator seminis, because the rest of the canal is so surrounded with muscles that their actions will sufficiently account for all the spasmodic symptoms that occur in the lower part of the passage.

If the anterior part of the urethra be laid open, we see that the inner membrane is continuous with the mucous coat of the bladder; that it is a secreting coat, and has a great many ducts opening upon its surface. If the pudic artery be injected with size and vermilion, the membrane will be seen to be highly vascular; if a portion of the urethra be distended, and the spongy body be carefully removed, the inner membrane will appear delicate and transparent, without the slightest trace of muscular fibres on it. When the urethra is first opened, there is an appearance of muscular fibres running in the length of the canal, but by examining this with attention, we shall find that it is principally owing to the inner membrane having been thrown into folds by the elasticity of the spongy body. We are referred to comparative anatomy for the ocular demonstration of muscular fibres; and it is confidently asserted in some late publications that circular muscular fibres may be seen in the urethra of the horse. I have carefully looked for them in this animal. On a superficial examination, we might suppose that there were muscular fibres in the urethra, but, on farther investigation, the appearance may be proved in this animal, as well as in the human body, to be nothing but the internal membrane thrown into folds by its own elasticity, and by that of the spongy body*.

The venous structure of the spongy body is supported by a set of fibres which have been generally supposed to be muscular, and if we hold them between the light and the eye, they have certainly some resemblance to muscular fibres; but if we stretch the part and again let it go, it will contract. This may be repeated several times, evidently proving that the contractility is not owing to an irritability belonging to the living part, but to elasticity.

I have not been able to discover any fibres in the membrane of the urethra of a man, of a horse, or of an ass; within two inches of the glans of a bull there are a set of fibres which meet at a point and resemble muscular fibres; but the urethra is possessed of so great a degree of elasticity in this animal, that we must suppose them to be of the same order of fibres as those which are seen in the spongy body.

The muscularity of the urethra has been attempted to be proved more by arguments from analogy than by ocular demonstration; for it is urged that muscular action does exist, even though muscular fibres be not visible. Of this, no one doubts, and I have lately had an opportunity of witnessing the fact. In attempting to inject the lacteals of a turtle, I had great difficulty in pushing on the quicksilver, and on trying to inject the arteries I succeeded no better. The cause was apparent when I observed the state of the intestines, for the vermicular motion was still distinct, the viscera having been removed from the animal only a few hours before. On the following day, the viscera having become quite flaccid, the quicksilver was thrown into the lacteals with the greatest ease; and the arteries which the day before pushed out the injection that had been forcibly driven into them, did not again contract upon it. This experiment proves that there is more than elasticity in lymphatics and arteries, for the power which prevented the injection from passing into them was destroyed by death; while in the urethra, we shall find that the power of contraction exists in as great a degree after death as during life.

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* The ejaculator seminis is continued up to the glans in the horse. When we see this strong muscle surrounding the whole of the urethra, we must be at a loss to suggest a use for muscular fibres in the delicate mucous membrane.

An hydatid has been given as an example of a body, in which there are no muscular fibres visible, but which will contract and dilate to a considerable extent. But is it possible for the muscular power of an hydatid, of a lymphatic, or even of an artery (in which the fibres are visible), to withstand a force equal to that which is frequently used in vain, to overcome what is called "spasm of the stricture;" for example, it has been said that "the bougie was grasped with such a degree of firmness that to withdraw it required a force equal to a pound weight;" but this was an old stricture, five inches and a half below the orifice. The cause of the difficulty of withdrawing a bougie in such a case will be shewn presently.

It is said that although the muscular fibres may not be seen distinctly in the natural healthy urethra, that they are visible in a canal where there is stricture, and that strictures commence by an irregular action of one of the fibres. There is certainly a fibrous appearance in the urethra posterior to a stricture, but very different from a muscle. It resembles the fibres which are formed on the peritoneum or pleura, by inflammation, and in many cases fibres are quite detached from the membrane, except at their two extremities, being similar to the bands which are occasionally seen running across hernial sacs.

If we examine a great number of slight strictures, very few examples of the urethra contracted into a regularly circular form will be found; but, in the greater number of cases, about one half or two thirds of a portion of the urethra will have become white and dense, or a firm white line will be seen running obliquely along the passage, and yet we do not find any oblique fibres described in the natural state of the parts. We must account for the formation of stricture on other grounds than the contraction of muscular fibres, for we find by dissection appearances which denote previous inflammation. There is a white dense line, not pliant like the other parts of the urethra, but firm and exactly similar to the stricture formed in the inner coat of the œsophagus, or to a thickening of a portion of the pleura or peritoneum.

The changes which are supposed to take place in the size of the canal during the natural actions, and the phenomena of disease, have been both adduced as arguments in favour of the muscularity of the urethra; for example, the diminution of the canal during the emission of the semen is given as a proof of muscularity, but the same diminution may be produced after death by injecting the spongy body. The expulsion of an injection in a case of gonorrhea has been considered as one of the most decided proofs; but if we throw an injection into the dead penis, the fluid will be thrown out with as much force as in the living body. I threw a small quantity of water into the corpus spongiosum, so as to swell the penis a little, making it resemble the state in which we generally see it in gonorrhea. On injecting the urethra, the fluid was thrown out nearly two yards. Surely no one will say that there was muscular action existing in the urethra of a body almost putrid; but on the contrary, it will be allowed that the injection was expelled by the elasticity of the parts. That this elasticity is as perfect after death as during life may be proved by the examination of the urethra of a horse, for the canal, though very small, will allow of dilatation sufficient for the admission of the thumb; and on withdrawing the thumb, the urethra will regain its former size: and this may be repeated several times. Is there any muscular part, which, after death, would admit of such a degree of dilatation, and again contract to its former size?

The expulsion of a bougie by the natural actions of the urethra has been given as another proof; but this may be also met by an experiment on the dead body. If we distend the spongy body slightly, and then introduce a bougie into the urethra, it will be gradually pushed out. We must recollect, that when a large bougie is passed in the living body, the penis is pulled up upon it. When we let the parts go, the penis recedes from the bougie, the muscles push it out a certain extent, and then there remains so small a portion, that we can readily conceive the elasticity of the parts to be sufficient to press out the remainder of this *conical* instrument.

The question is asked, "why does the urine flow in a diminished stream during an attack of gonorrhea?" While the inflammatory stage continues, (at which time alone is there difficulty of passing the urine) the calibre of the canal is to a certain extent diminished by the swollen state of the parts; but what is of more consequence, the muscles of the perineum and the detrusor urinæ are very irregular in their actions, in consequence of the increased sensibility of the membrane to the acrid urine; and if we recollect the numerous muscles which surround the lower part of the canal, we can have no difficulty in explaining why the urine should occasionally stop, or why a stimulating injection should be prevented from going into the bladder.

We find the following expression very commonly made use of. "Spasm comes on a stricture so as to prevent the passing of a bougie, which a short time before entered freely." We must acknowledge that there is a sensation, which gives this idea, very frequently experienced in the lower part of the canal. To explain this symptom, it will be necessary to refer to the consideration of the natural action of the muscles of the bladder, and those surrounding the urethra. The bladder is furnished with a strong muscle, the detrusor urinæ, and the lower part of the urethra is surrounded by a set of muscles which may be considered by their actions as the sphincters of the bladder. Before the urine can flow, it is necessary that the detrusor urinæ should contract, and that the muscles surrounding the urethra should at the same time relax. While a person is in perfect health, it is not possible to make the urine flow by pressure on the abdomen, but in a paralytic state of the lower part of the body, the urine may be forced out by pressure, because, in this state, the muscles of the perineum are passive, while by pressure, the action of the detrusor is imitated. I have witnessed a case which gave a very striking proof of this.

A gentleman with stricture, had been so entirely mismanaged, that the bladder was allowed to become much distended, and being neglected in this state, he became comatose. It was not possible to introduce a catheter. Instead of puncturing the bladder, which could have been the only hope in such a case, the surgeon was satisfied with trying to empty the bladder by pressing on the abdomen. As the patient was now paralytic, the urine flowed through the narrow stricture; upon which the surgeon exultingly said, "You see there is no necessity for doing any thing more;" the same effect would have been produced by pressure on the distended bladder of the dead body. Thus a certain sympathy must exist between the two sets of muscles, before the natural action can take place; but this sympathy is very apt to be disturbed by any cause, producing irritation on the inner membrane of the urethra, and particularly by stricture, for the point of stricture is always the seat of irritation. The urine is pressed forward by the detrusor urinæ, the muscles of the perineum relax, until the urine comes up to the stricture; but there the acrid urine naturally produces irritation, and the surrounding muscles are called into action, as they are governed by the sensibility of the membrane. For the same reason, the muscles are irritated so as to prevent the farther entry of a bougie, which has been passed down to an irritable stricture. The means of removing this spasm give us the best idea of its cause. By passing down the caustic to an irritable stricture, the morbid sensibility of the stricture is destroyed, and then a bougie will pass, or the urine will flow, without producing such an excitement as will bring on spasm of the surrounding muscles, which, when present, has been called "spasm of the stricture*."

This explanation will not account for spasm, which is alleged to take place in the canal, anterior to the insertion of the ejaculator seminis. I have considerable difficulty in arguing this part of the question, because I have never seen a spasm of the urethra at the glans, and I have been assured by surgeons of great eminence, that they have never seen it, yet I know that there are some surgeons who say, that by a single touch of the caustic, they have seen the urethra at the glans fly open, which the minute before was spasmodically contracted. Instead of insisting that the invisible muscular fibres form the obstacle to the passage of a bougie, in the anterior part of the urethra, may we not rather assign some of the following causes? On introducing a bougie, the point may at first strike against the edge of the stricture, but becoming softened, it may turn up and pass through; it may have got into one of the lacunæ, or by exciting irritation, it may produce a sudden flow of blood into the corpus spongiosum, which will gradually subside, and then the bougie will pass easily, for we may see by an experiment, that the slightest quantity of water thrown into the veins of the spongy body, diminishes the calibre of the urethra very much.

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* Antispasmodic medicines relieve the spasm by subduing the irritation. It is necessary to remark, that the cases which are recorded as examples of relief from the use of those medicines, were strictures in the lower part of the urethra, and were completely within the action of the strong muscles.

The following symptom of spasm may take place at any part of the canal. " The bougie is grasped and held by a spasm in a stricture." I have seen a gentleman tug at a catgut bougie, which he had passed through a very old narrow stricture, and heard him say, " mark what a degree of spasm there is." On withdrawing the bougie, it was found that the part which had been passed through the stricture, had become soft and swollen, while the part which was embraced by the stricture was firm and round. In attempting to withdraw the bougie, he had pulled the button-like end of the instrument against the firm stricture. The same thing happens in a slighter degree, to the wax bougie. The instrument is pushed with a certain force through the stricture, by lying in the passage it becomes softened, that part which is in immediate contact with the stricture, is indented, for though the stricture was forcibly distended by the bougie, while hard, it will make an impression on the softened instrument. But it is curious, that a stricture in almost a cartilaginous state, should be supposed to be capable of contraction and dilatation. Do we find any thing analogous to this, in the muscles, does the portion of the sterno-cleido-mastoideus which when cartilaginous, produces the wry-neck, ever contract or elongate?

Were the urethra muscular, would it not throw out the gonorrheal matter with a jerk, but can a patient ever do that? Were it muscular, in a state of disease, should we not find it contracted and fibrous, as the bladder is in a case of stricture? To prove that it is not so, I shall describe only one of the numerous examples which are to be seen in Mr. Bell's museum. There is a stricture near the glans, which admits only a bristle. All the urethra behind, is so enlarged, that the finger may lie in any part of it, and instead of its surface being fibrous, it is perfectly smooth, while the bladder is strong and muscular. If we allow the urethra to be a passive membrane, we can then understand how it has become so enlarged by the continued action of the detrusor urinæ, to throw the urine through the stricture. But it may be asked, why is not the canal collapsed by its own elasticity, and by the pressure of the elastic spongy body? In answer to this, we find, that the spongy body, in the greater number of bad strictures, becomes quite altered in structure by the continued irritation; the oblique fibres adhere together, and in many of these cases, the whole penis wastes, is not capable of erection, and becomes wonderfully short and small, while in others, apparently by a deposition of lymph, during the attacks of inflammation, the penis is permanently enlarged.

Is it possible for a muscle, which if it does exist, is allowed by all, to be of a finer structure than any muscle of the body, to resist the action of the fibres of the bladder? which, in cases of stricture, are so strong; or can it resist the weight of the hand, and such force as is sometimes used to overcome the "spasm?" Is it possible to preserve in spirits, a spasm of a muscle, after the part has been macerated almost to putrefaction*. With as much truth, may we call the preparations of the thickened membrane in hernial sacs, examples of the spasmodic affection of the peritoneum.

I shall now describe that structure, to which I referred in the beginning of the paper, and which, as an anatomical fact, should go a great way to settle the question of the muscularity of the urethra.

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* There may be seen in anatomical museums, preparations marked "Specimen of Spasmodic Stricture."

The membranous part of the urethra has been always described, as that portion which is between the prostate and the bulb, and is called membranous, to distinguish it from those parts of the canal, which are surrounded by the prostate gland, or the corpus spongiosum.

The preparations and drawings which are upon the table, will shew that there is a structure within the membranous part, which, in some degree, resembles the spongy body. It may be seen in the horse, as distinct as the rete vasculosum in the vagina, by merely dividing the urethra, but it is necessary to inject it, before we can shew it in the human body. It may be injected in several different ways: if we put the injecting pipe into the spongy body, by using a very little pressure, we may fill the corpus spongiosum, from the bulb to the glans; if we use more force, and then cut through the cavernous body, so as to expose the lower surface of the urethra, we shall probably see a regular vascular structure, immediately under the mucous membrane, which does not terminate at the bulb of the corpus spongiosum, but passes into the membranous part.

The best manner of shewing this structure, is, to puncture the mucous membrane, and to introduce the mercurial injecting tube under it. If the pipe be properly introduced, the mercury will not flow into the spongy body, but will pass under the membrane of the urethra, filling a very remarkable net-work of veins. These veins are spread all over the urethra, but at the membranous part, they are accumulated, lying one over another in the length of the canal, so as to form two distinct columns, with a groove between them, which extends from the caput gallinaginis to the glans. The columns unite and surround the membrane forming the sinus pocularis, which itself, from its vascularity, appears to be capable of erection. The peculiar character of the vascular structure is lost, on the prostate, by the termination of the vessels in a net-work of veins which have communication with the common veins of the bladder. If we continue the injecting force, and interrupt the course of the mercury, it will pass into the spongy body, proving that there is a communication between the corpus spongiosum and this vascular structure, but by no means so free as between the glans and the bulb*.

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* I had by chance filled some of those vessels in the upper part of the urethra, some years ago, while preparing the parts for demonstration. I was rather checked in the pleasure of thinking I had made a discovery, on being told by Mr. Bell, that the same vessels had been described by Dr. Barclay. On referring to Dr. Barclay's Paper in the First Volume of the Edinburgh Medical and Surgical Journal, I found that he had only filled a few of those vessels, on the upper part of the urethra, which by

I have placed upon the table, the bladder and lower part of the urethra of a stallion poney. There are many points of the anatomy of the human urethra, explained by this preparation. The two columns and the channel between them, are more distinctly seen than in man, because the corpus spongiosum in the horse, is more evidently divided into two portions. It is so completely separated on the upper part, that about an inch of the urethra near the glans is not on its lower surface covered by the spongy body. It is very easy, to separate, in this animal, the bulb from the internal spongy body; in the preparation on the Table it is held suspended from the internal spongy body, which is seen to pass along the membranous part of the urethra, in two columns, that unite and form another bulb anterior to the prostate*.

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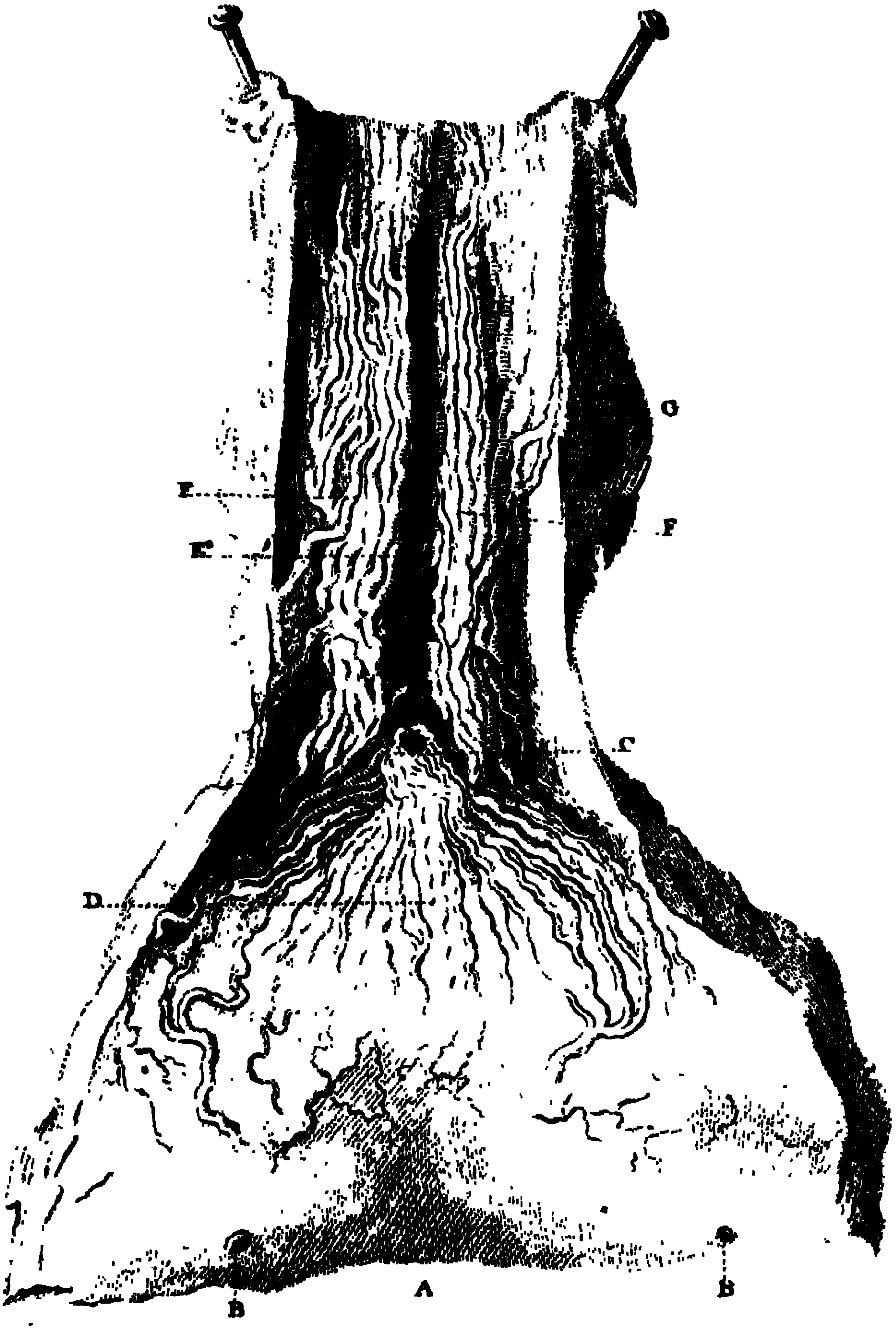
some Anatomists, had been supposed to be lymphatics. I pursued my investigation, and discovered the spongy body surrounding the membranous part. Since I wrote this paper, I have seen the Work of Professor Moreschi of Milan; Commentarium de Urethræ corporis, Glandisque Structura; and I have also had a conversation with Professor Antomarchi of Florence, the Editor of Mascagni's posthumous Works, by which I find, that the researches of the Italian Anatomists had not extended to the membranous part of the urethra, but had been confined to the upper part, to determine the question so much agitated upon the Continent at present, whether the structure of the corpora cavernosa and spongiosa be vascular or cellular?

* Cowper's glands and the prostate are preserved in this preparation, they form an excellent illustration of the structure of these parts in the human subject. The vesicula seminalis in the horse, is really a bladder, and is surrounded with muscular fibres, nearly as strong as those of the urinary bladder.

This structure in the human body, is of much importance in a surgical point of view, for when we consider its great vascularity, we cannot be surprised that the vessels should be so often opened by our instruments, and continue to throw out blood for a length of time, if excited by a degree of erection. Perhaps the cases where the patient has been so miserable, from defective action in those parts, where the semen is passed with the urine, may admit of explanation, by the facts which have been detailed, for in the greater number of the instances, where the semen was pressed back into the bladder, there has been an imperfect erection, and consequently the little eminence, which may be called the internal bulb, would not be distended so as to fill the urethra, and direct the semen forwards into the channel, between the two columns, while the ejaculator seminis was acting spasmodically upon it in the sinus.

I may be now permitted to take this structure as an anatomical fact to disprove the existence of muscular fibres in any part of the canal, for I have been able to shew, that what has been described as muscular fibres immediately under the mucous membrane, is the uninjected vascular texture of the internal spongy body.



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EXPLANATION OF THE PLATE.

A. Part of the bladder.
B. B. Entry of the ureters.
C. Sinus pocularis of the caput gallinaginis.
D. Veins on the prostate.
E. Canal formed between the columns.
F. F. Two vascular columns, forming the internal spongy body in the membranous part of the urethra.
G. Part of the bulb of the external spongy body.

SOME OBSERVATIONS

ON

INVERSION OF THE UTERUS;

WITH A CASE OF SUCCESSFUL EXTIRPATION OF THAT ORGAN.

By JOHN WINDSOR, F.L.S.

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COMMUNICATED BY

MR. ASTLEY COOPER.

Read June 22, 1819.

OF all the accidents to which the act of parturition is exposed, an inversion of the uterus itself is one of the most formidable. If its reduction be not almost immediately effected, fatal consequences very frequently ensue, either at the time, from the violence of the hemorrhage, or at a more remote period, the powers of life may, from the same cause, be gradually exhausted.

The records of medicine afford sufficient evidence of the truth of these assertions, and therefore I hope the following case, and accompanying remarks, will not be thought uninteresting.

Inversion of the uterus is probably not so rare an occurrence as many suppose, even in the present day, when so much information on the particular branch of medicine, of which it forms a subject, has been diffused by the medium of lectures, and the writings of numerous valuable authors; for as the accident is generally thought to imply a degree either of carelessness or rashness, on the part of the accoucheur in the extraction of the placenta, he will endeavour, with a view to save his own credit, to keep the real nature of the affection as secret as possible; and an early death often assists in throwing the shade of oblivion over the patients themselves. Within a very short time, I am acquainted with three cases that have occurred in this neighbourhood only. One forms the subject of this Paper; the second occurred to a midwife last winter, and terminated fatally in a few hours, from severe hemorrhage; of the body of this person, I had an opportunity of witnessing the inspection after death; the third, a chronic case, is now under the care of a medical gentleman, at a short distance from Manchester. Within the last few years, other instances of this accident have occurred in this neighbourhood*.

Happily, however, the accident admits of remedy, if an intelligent person be near at hand to replace the uterus in its natural situation; if this be done immediately, and if the hand of the accoucheur be retained in the cavity of this organ, until it has considerably contracted; and if the patient be confined for some time afterwards to the recumbent posture, she will generally, I believe, do well. This happened in the practice of a gentleman about twelve miles from this town, nearly half an hour after the occurrence of inversion. In another case, about six miles hence, the accoucheur removed the placenta before the uterus was re-inverted, a plan perhaps less safe than removing it where the uterus is first replaced; in both instances the patients recovered well.

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* Within the last few days, a professional gentleman, living nine miles from this town, has informed me of a case he had, where the exhausting hemorrhage was fatal in about four years.

Where the uterus and vagina are in a relaxed state, and the female has been subject to prolapsus uteri, I believe there is a greater disposition to the occurrence of inversions at the time of labour, than when such a condition of the parts does not exist. This was the case with Harriot Barwick. In such patients, therefore, it is desirable that the medical attendant be extremely attentive and cautious, in assisting the expulsion of the placenta. I am acquainted with two sisters, both married, one of whom has had a considerable procidentia vesicæ, since the age of fourteen or fifteen; and the other is much troubled with a prolapsus uteri, so that during her last labour, the os internum descended even beyond the external parts, yet in both of them, by careful treatment, no tendency to inversion has manifested itself during parturition.

In all cases, it is highly proper for the accoucheur to examine, after the expulsion of the placenta, if the os internum be free. At the same time his hand may be placed on the abdomen, to know if the uterus is in its natural situation, and thus ascertain that there is no tendency to inversion.

In consequence of the neglect of this practice, it is to be feared that many lives have been lost; the true cause of the succeeding hemorrhage not being ascertained till too late, as happened in the fatal case that occurred to a midwife here last winter; and that was alluded to above. The gentleman who was sent for, informed me that he had visited her twice before he became informed of the true cause of the hemorrhage, and by this time all art was unavailing. The danger of these cases is in delay. If the replacing of the uterus be not very soon accomplished, it generally becomes, from the quick diminution of its cavity, and the thickness of its contracted parietes, utterly impracticable.

If the patient be enabled to survive the immediate effects of the injury, and the reduction of the inverted uterus to its natural state cannot, by persevering attempts, continued as far as her feelings and safety will admit, be effected, then a train of symptoms occur, from the severe hemorrhage, and the unnatural position of the parts, which will demand the watchful aid of the medical attendant. Some degree of inflammatory symptoms accompanied with fever ensues; the abdomen becomes full, tender to the touch, and at its lower part, sometimes rather hard; there is costiveness of the bowels, and, sometimes, retention of urine, requiring for a time the use of the catheter. By the use of fomentations, enemata, laxatives, and an antiphlogistic regimen, the symptoms abate, the power of expelling the urine, especially if the uterus is first raised a little in the vagina, is regained, and the patient gradually recovers the full power of this function. Afterwards she becomes able to walk about, suckles her infant, and perhaps enjoys apparently even a tolerable state of health; yet the sanguineous discharges are, generally after a time, occasionally returning profusely, and her exsanguineous countenance and emaciated appearance sufficiently indicate the debilitated state of her constitution.

About the time she relinquishes the office of suckling, the menses return more regularly, the discharges of blood are very considerable in quantity or of long duration, the mucous discharges are generally copious at other times, and the constitution begins to sink under the reiterated losses it sustains. The pulse becomes frequent, the appetite is impaired, a cough with hectic symptoms sometimes occurs, and the patient is quite unable to pursue her usual domestic duties. In this state palliative means, as the use of astringent and other remedies, become inadequate to check the exhausting progress of the complaint, and the unfortunate sufferer must soon perish, except some decisive means are devised for her relief. In this painful extremity, the extirpation of the uterus itself has been proposed, as the most efficient means of relief, and, formidable as the operation at first view seems, it is known to have been already performed with success.

Besides the cases previously on record, partly doubtful and partly authentic, a very successful case has lately been published by William Newnham, in his excellent treatise on Inversio Uteri*. To this gentleman the profession and public are indebted for the recommendation of extirpation, under certain circumstances, in the chronic stage of inversion of the womb. An individual case, however, is very insufficient to decide the propriety of a comparatively new mode of treatment; considerable time and experience are still necessary fully to sanction so bold a practice. On this account, I beg indulgence for the detailed relation of the following case, to which I shall subjoin a few observations and suggestions, on the best mode of accomplishing the operation.

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* Since the above was written, there has been another successful cure by Dr. Davis.

1817—January 10th, 9 *p. m.*—I was requested to visit Harriot Barwick, æt. 30, the wife of a baker, No. 9, Back Falkner Street, Manchester. From her own account, and that of the surgeon who had attended her, it appeared that she had been delivered of her first child on the morning of the preceding day. The labour had gone on well, and she was congratulating herself amongst her friends on its comparative ease, when the difficulty with the placenta arose. After waiting about an hour, the surgeon, an intelligent gentleman, passed his finger into the vagina, and finding the placenta, as he thought, descended, he extracted it, without the employment of any immoderate force; however, its removal created to the patient excessive suffering; violent hemorrhage, tinnitus aurium, and syncope followed, and she believed herself about to expire. Finding that a descent of the fundus uteri had accompanied the expulsion of the placenta, the accoucheur pushed it up beyond the os uteri; in the evening he examined, and found it not in the vagina, but the following morning it had returned into the vagina.

At the time of our consultation this evening, it appears that she has lost much blood from the uterus; the abdomen, especially about the umbilicus, is very tumid, hard (as if from the contracted uterus,) and tender. Pulse 120, and small. No stool since the 6th instant, though oleum ricini and an enema have been used to-day. Has passed her urine tolerably; complains of thirst. On introducing two fingers within the vagina, I felt a substance (evidently the inverted uterus) about as large as the fist, increasing somewhat in diameter upwards, and passing through the os uteri, which was in its natural situation, and considerably dilated by it; it protruded into the vagina nearly to the os internum, felt hard and rugous, and was tender to the touch, though not so much so as the posterior part of the vagina.

The surgeon who had been her accoucheur, now attempted the reduction; but his efforts, continued for about a quarter of an hour, were ineffectual. The woman, during this, complained of much pain, and there was a great discharge of blood; indeed, so much tenderness and inflammatory disposition had by this time apparently invaded the parts, as appeared to render all further attempts to replace it, both imprudent and unavailing. It was now, therefore, determined to sooth and palliate symptoms as much as possible; the abdomen was ordered to be frequently fomented; the domestic enema to be repeated, and a solution of magnesiæ sulphas in infusum sennæ, to be taken every three hours, till the bowels were opened.

January 11th, eight o'clock, *a.m.*—The enema procured two pretty free natural motions; abdomen still tumid, hard, and tender; has had a considerable sanguineous discharge during the night; tumor in the vagina the same; has voided a moderate quantity of urine; pulse 120; some thirst; no appetite; skin of a natural warmth. The breasts being rather full and painful from milk, were directed to be drawn. To have her belly well fomented every two hours, and to have a dose of diaphoretic mixture every three hours.

Eight o'clock, *p. m.*—Symptoms better than in the morning; two stools to-day, and urine moderately free, but is often obliged to press up the uterus before it will flow, as she used to do with her prolapsus; abdomen subsided, softer, and less tender; discharge rather diminished; teased with a cough, for which a mucilaginous mixture, with tinct. opii, and liquor antimonii tartarisat. was directed.

From the 12th to the 14th she was rather improving; the belly became softer and less tender; the bowels required occasional assistance of an aperient mixture; passing of urine difficult and painful; cough much better; breasts less painful; lochia diminished; pulse 96, and rather soft; tongue moist; appetite better; lives chiefly on oatmeal gruel. Was up a few minutes to-day, when the uterus protruded rather more than usual.

17th.—Has had a feeling of considerable heat in the abdomen for the last two days; pulse 96, and of moderate strength; tongue moist; great thirst; appetite moderate; bowels open; discharge almost colourless; urine passes with pain; sleeps pretty well; breasts rather painful, but less swelled.

20th.—Urine, for the last few days, drawn off twice daily by the catheter.

29th.—The os uteri is now so much dilated, as easily to admit the fingers between it and the protruding uterus; from the latter there is some coloured discharge; febrile symptoms gone off. For the last week has been able to void her urine, but the evacuation of both it and the stools somewhat obstructed; appetite and sleep pretty good; milk free.

February 8th.—Since last report she says, that at each evacuation of the fæces, the uterus comes low down; she then suffers much pain, and about half a pint of blood is lost; evacuation of urine also painful, especially about the end of the act; pulse 76; appetite moderate. An alum lotion has been used by means of sponge, but without apparent advantage.

March 22nd.—Uterine tumor still in the same situation, but appears reduced to nearly its natural size; it does not fill up the vagina so completely as before. The fingers pushed up through the os uteri occasion considerable pain; and the uterus seems to have very nearly its whole length external to this part; the sanguineous discharge has continued till within the last few days, and after an examination, the fingers are still covered with coagula of blood. For the last few days has had considerable leucorrhœal discharge. Frequently feels much pain on the left lower part of the abdomen. Urine pretty free; bowels sometimes rather costive, and then the uterus descends more with the passage of the stools.

August 30th.—Is able to go about, and appears to be in tolerable health.

September 30th.—The sanguineous flow returns every three weeks in considerable quantity, and sometimes in the intervening time, although she suckles. The uterus protrudes downwards at each evacuation of the bowels.

May 20th, 1818.—Has weaned her child about three months since. At the first menstrual period after weaning it, she had a very copious discharge of blood from the uterus, amounting, she supposes, in two or three days, to several pints. Has had a return of it twice since, but not quite to the same extent. Complains of very great weakness.

August 15th.—The menstrual discharges continue very profuse, or, if less in quantity, are of longer duration. On one occasion, lately, I was requested to visit her immediately, as her friends thought her about to die, from the excessive discharge; and I certainly found her much reduced by it. Complains much of a pulsating feel in the head, and of a singing in the ears. Pulse quick; bowels generally costive; urine free; appetite tolerable. Countenance very pallid; feels extremely weak, and unable to follow any business. Has a troublesome cough. For the last two or three weeks the sanguineous discharge has been constant and free. On examining, *per vaginam*, to-day, the uterus found in the same state, the fundus reaching to near the os externum.

It is here proper to observe, that about the middle of March last she was seen by Dr. Hull, who, from that time, was interested in the progress of the case.

The solutions of alum, with sulphate of zinc, were recommended to be applied to the part, and the tinct. ferri muriati was administered internally.

The disease continued to resist all common means of relief, and, indeed, she was less attentive than we could have wished, in observing our directions, and in keeping herself quiet and cool, when the discharges were upon her. Her living, also, constantly over a hot bake-house, was probably prejudicial.

August 22nd.—Since the 16th it has been determined to have recourse to the operation of tying the inverted uterus, which, for some time, has been looked up to as a last resource. Of late there has been an evident decline in her strength, from the copiousness and long duration of the uterine sanguineous discharges; the pulse generally from 100 to 120; frequent feeling of faintness. Her weak state of health renders her life uncomfortable, and disables her from aiding her husband in his business as a baker.

These circumstances now render her desirous of immediately undergoing the operation, and it is appointed to be performed at four o'clock, *p. m.* on this day. A draught, with fifty drops of laudanum, was given a short time before the operation; for two days, also, before this, her bowels had been kept open by an aperient mixture. We placed her sitting on the edge of the bed, with her legs raised upon a chair on each side. Having her situated in this convenient position, which Dr. Hull thought preferable to the recumbent one, I anointed the fingers of my left hand with oil, and passed them up to the inverted uterus, the lowest portion of which descended to about an inch within the os externum. I unexpectedly found the uterus so relaxed, that I could draw it down, and without difficulty brought it into sight, about two inches beyond the os externum. A single ligature of the strongest dentist's silk was thus easily passed round it, and tied as firmly as possible. Besides this, a similar ligature, inclosed in a canula, was passed round the same part, and each end secured to a ring placed on each side of the base of this instrument; but the easy descent of the uterus without the os externum, rendered the means devised to facilitate the tying, in a great measure unnecessary. The canula I used on this occasion was made of copper, slightly curved, (though a straight one would have done), and being flexible, would yield any way, about the diameter of a middle sized male catheter, and about two-thirds of the length of that instrument.

The uterus being thus tied, was pushed gently up within the vagina, to the place it previously occupied. The patient expressed surprise at the operation being accomplished so soon and so easily. About three ounces of blood issued from the uterus at the time of the operation, which altogether took up only a very short time, perhaps ten minutes.

The pulse, just before the operation, was 96; she suffered little pain immediately afterwards, but in about five minutes it became severe, and the pulse was now 72; it continued severe about one hour and a half. The anodyne draught was repeated, and as she complained of a feeling of great heat at the lower part of the abdomen, a camphorated spirituous embrocation was directed to be applied by means of folded cloths, a little warm water being each time added. She was directed to take a dose of saline effervescing mixture every two hours, and to use light simple drinks for her food. In the evening, pain diminished; pulse 76; no vomiting; belly soft and easy; slight sanguineous discharge from the vagina. A starch glyster, with a drachm of tinct. opii, was ordered to be injected at bed-time.

August 23rd, 7 o'clock, *a. m.*—The enema was retained; has slept pretty well, and says she has not felt better any morning for the last two months. Pulse 90; tongue moist; some thirst; urine free; no stool; occasional pain in the belly, but relieved by the embrocation; ordered an aperient mixture, with senna and sulphate of magnesia.

Half past ten, *p. m.*—Has slept much during the day. For about an hour this evening she felt a good deal of pain in the fore-part of the right thigh, extending nearly to the knee; occasionally has felt pain in the lower part of the abdomen, but it is soft, and free from tenderness; complains a little of her back; pulse 96; urine free; bowels opened twice by the aperient.

I tightened the ligature on the canula about one-fourth of an inch, this evening; and she felt considerable pain for a short time afterwards.

24th, seven o'clock, *a. m.*—Has slept about half the night. Pulse 104, and of tolerable strength; thigh easier, but complains a little of pain in the lower part of the back; belly soft and easy; tongue moist, and pretty clean; no appetite; bowels rather open; urine free. The ligature being tightened to-night, occasioned some pain, but it went off almost immediately.

25th, ten o'clock, *p. m.*—Pulse 100. A little pain on left side of belly, probably owing to flatulence from eating potatoes at noon; one natural stool to-day; appetite moderate; no thirst; the ligature being tightened firmly to-night, she felt much pain from it.

An anodyne enema to be given directly. The warm camphorated embrocation to be applied, and twelve leeches, if the abdominal pain increase; a dose of the aperient early in the morning.

The ligature we thought it best to tighten daily, and to tighten it very much, in order to deaden the uterus as effectually as possible; on introducing a finger this evening, the ligature seemed to have made a considerable impression, a pretty large fissure being very distinct.

26th, eight o'clock, *a. m.*—Slept moderately. After tightening the ligature, last night, she felt a good deal of pain in the uterus, but more along the fore part of the thigh; and on awaking at times in the night, was troubled with flatulent pains in the belly. Took a draught of the laxative mixture early this morning, which was rejected, probably from the opiate having disordered the stomach; has had one rather free natural stool; urine natural; appetite moderate, and food well retained. The injection and aperient mixture to be repeated.

Half past nine, *p. m.*—On the whole has suffered more to-day, than on any preceding day since the operation, from pain in the belly, especially on the left side, in which part she has, ever since her accouchement, had occasional pain. Pulse 106; two loose free stools from the enema and aperient; ingesta all retained. The ligature tightened this evening, gave her pain. Ten leeches were applied to the abdomen this afternoon, and are directed to be repeated in the night, if the pain should return severely. Has had her anodyne draught as usual this evening about an hour before the tightening of the ligature. To have an opiate enema, and the purgative mixture to-morrow morning.

27th, half past seven o'clock, *a. m.*—Has passed a nearly sleepless night, from pain in the belly, back, and thighs, but is easier since. Seven leeches were applied to the belly this morning. Pulse 120, and small; tongue clean; great thirst; urine free; no stool since yesterday morning, though the aperient mixture was taken twice this morning; skin of a natural temperature, yet complains of a burning feel in the belly; nausea, but no vomiting. Let the purgative mixture and enema be repeated.

Ten o'clock, *p. m.*—Has been easier, and has slept moderately this afternoon; rejected her purging mixture; a powder of hydrarg. submur. gr. v. cum pulv. antim. gr. ij. taken about noon, was retained, and she has had two free loose stools this afternoon. Pulse 116; skin of moderate temperature; abdomen less tender, and feeling of heat in it diminished. In tightening the ligature this evening, a considerable fissure could be perceived; for two or three days a rather fœtid discharge has been noticed, for which she has occasionally used a chamomile injection. To continue the saline mixture, and to take one grain of opium immediately.

28th.—The ligature was tightened as usual each evening, from a quarter to half an inch; she always complains of much pain from the tightening, but it soon goes off.

29th, half-past seven, *a. m.*—Slept about four hours last night, after the use of the pills and anodyne enema, but the pain after the tightening of the ligature continued for two or three hours; has considerable tenderness of the belly this morning, owing chiefly to the leech bites, and at present feels pretty easy. Pulse 106, moderately full and strong; tongue clean; some thirst; complains of being frequently sick, and of occasional vomiting.

Ten o'clock, *p.m.*—We, for the first time, reluctantly omitted tightening the ligature this evening, as she was much afraid of a repetition of the pain she suffered last night.

30th, seven o'clock, *p. m.*—Has had a very good night. Pulse 106; some pain in the belly, but no tension; and it may be here observed, that she is usually of an exceedingly irritable complaining disposition. Tongue clean and moist; bowels open; urine free; stomach tolerably tranquil.

This morning I brought down the uterus, as at the first tying; it appeared rather enlarged than diminished in size since it was first tied; the ulceration had now extended about three quarters or four fifths through it. A single waxed ligature was again tied *very firmly* round it; at the same time, the ligature in the canula was tightened, and then the uterus was raised into the vagina to its usual situation. It was our intention, if the fissure in the uterus was not found considerable, to pass a needle through the remaining portion, armed with a double ligature, so as to divide it into two portions, tying each separately, and thus to accelerate the process of separation, a mode, perhaps, very eligible at the first tying, where the uterus can be brought into view; but on examination, so small a portion remained, that we thought it unnecessary. In drawing down the uterus, without the os externum, care was taken to do it as gently as possible, in order that any adhesions to the bladder, rectum, or surrounding parts, might, if they existed, be disturbed as little as possible. Opiates both in draught and in glyster, were prescribed, and the saline mixture continued.

Half past nine, *p. m.*—Has slept well to-day. Pulse, which came down to 80 after the tying, is now 104. Bowels opened freely this afternoon by a domestic enema; belly soft, but still pain in it, and in her back; tongue clean; considerable thirst; moderate appetite. A poultice to be laid on the belly. The pills, with calomel and antimony, to be repeated, and the occasional use of anodyne injections continued.

31st, eight o'clock, *a. m.*—Pulse 96, moderately full and strong; had five or six hours' sleep in the night; slight sickness and vomiting; pain and soreness in the belly, back, and thighs; urine free; no motion since last night. She sometimes rejects the saline effervescing mixture. The pills to be repeated.

Two o'clock, *p. m.*—Pulse 125, and weaker, but respirations only about 28 in a minute; feels very faint and weak; belly sore; domestic enema was returned very little changed; no vomiting since morning; complains of much beating sensation in her head. Six leeches, followed by a poultice, to be applied to the abdomen.

Eight o'clock, *p. m.*—Pulse 120, and rather firmer; had a yellowish free loose stool about three o'clock in the afternoon, when the ligature was tightened, and soon afterwards the usual composing enema was administered. Has slept tolerably to-day, yet complains of soreness of the belly, and pain of the part, but is somewhat easier than in the afternoon; no vomiting since morning; skin rather warm and moist; tongue, as usual, clean; urine free; troubled, somewhat more than usual, with a cough. On the whole she certainly is worse to-day than at any time since the operation. A saline mixture, with tincture of opium, was prescribed.

September 1st.—No vomiting, excepting a little of her medicine; two free dejections after taking some magnesia. Pulse 124, moderately full and strong; belly rather tender; pain in back, and on anterior part of the right thigh, down to the knee, nearly similar to what often occurs in dysmenorrhœa; urine free; skin warm; cough better; respiration easy. I tightened the ligature this morning, afterwards she had nine drops of the black drop in a draught, and the anodyne injection.

Four o'clock, *p. m.*—A good deal of pain to-day in the part, and in the back, but has slept tolerably well at intervals.

Nine o'clock, *p. m.*—Has vomited a little curdled milk and fluid slightly tinged with bile. Bowels open; urine moderately free; skin warm and moist; tongue moist and clean; pulse 120; belly rather tender, but not tense or tumid. She will not permit the ligature to be tightened this evening.

Rep. haust. anodyn. hâc nocte et manè.

2nd, half past seven, *a. m.*—Slept pretty well. Pulse, 114 in a minute; but after tightening the ligature this morning, it diminished, as usual, and fell to 100. Fœtor of vaginal discharge continues. Complains of general soreness over the breast, belly, and thighs. A mucilaginous linctus with tinct. of opium, was prescribed.

On examining this evening, which is the twelfth day since the first application of the ligature, the thin, or rather broad peritoneal surface of the uterus appeared to be the only portion remaining undivided. It was, therefore, thought advisable to complete the separation, by dividing this part with a pair of scissors, which gave her very little pain. No hemorrhage followed. The pulse after this fell to 108 in a minute. The remaining cervix uteri was now gently raised, and supported by a little sponge introduced, and another piece applied externally with a T bandage over it, so that compression might be used, if any bleeding should occur. The anodyne draught was repeated.

The removed uterus measured three inches from the fundus to the cervix, and the same from side to side, being nearly square, but a little rounded off at the fundus; colour chiefly red, but probably from incipient putrefactive process, marked a little with greyish spots and lines; the circumference of the whole around the fundus and cervix exactly nine inches.

The uterus being cut open, exposed a part of the fallopian tubes, and the ligamenta rotunda; the ovaries and the fimbriated extremities of the tubes, it was found, were left behind. The length of the fallopian tubes removed measured two inches and a half on each side; the extremities of them on the naturally internal rugous surface of the uterus admitted a bristle; coagulated lymph in small quantity, and but slightly adherent, was observed on the peritoneal surface, but the uterus was open at the part where it was divided, the opposed peritoneal coverings having not become sealed together by the adhesive inflammation. The mouths of a few blood-vessels appeared on the rugous surface.

3rd, half past seven o'clock, *a. m.*—Has slept moderately since three o'clock; one copious dejection; no vomiting; has still a feeling of general soreness; same appearance of aphtha in the mouth; belly soft; has had no bleeding from the part, though she soon removed the sponge, as it produced uneasiness; urine free. Pulse 108, and of moderate strength. The embrocation to be continued; and to take, every two or three hours, a draught with ten grains of subcarbonate of soda.

Ten o'clock, *p. m.*—Has slept moderately today; less pain in the back and thighs; mouth also better; some cough, with mucous expectoration. Fœtid discharge gone. Complains of weakness, and of soreness of the belly, to which common poultices are directed to be applied.

5th.—The inside of the lips and cheeks exhibits numerous small superficial ulcers, attended with an almost constant flow of saliva. Appetite pretty good, but deglutition rather difficult, from a feeling of soreness in the primæ viæ; very little soreness in the part, or in the abdomen; pain in the back and thighs diminished; has little cough; respiration easy. A little magnesia was added to the draught.

6th.—Ulcerated state of mouth, with slight ptyalism and difficult deglutition continue, and prevent her rest. Pulse 114; bowels open; urine pretty free and clear, but the voiding it rather painful; appetite tolerable; still a little pain in the back and belly; no pain in the part, and scarcely any discharge from it. The anodyne to be taken occasionally; a linctus, with soda and tinct. camphor. comp. to be used, and a draught with half an ounce of infusion of calumba, to be taken every three hours.

7th.—Pulse 112; pains and soreness much diminished; mouth and throat rather better; bowels open; urine free; a little whitish discharge only from the vagina. To take a little wine with her gruels and jelly.

8th.—Slept moderately, but complains of feeling very weak; ulcerated state of mouth, with almost constant spitting out of saliva, and occasional hawking up of mucus, troublesome; had two dejections yesterday, containing some blood and slime; throat sore; a little pain and feeling of flatus in the abdomen. Pulse 120, and rather small; appetite moderate; but deglutition difficult. An enema of milk, in which aniseed and carraway-seeds were boiled, was given. A poultice to be applied to the abdomen; and a draught, with infusion of cascarilla, to be given every four or six hours.

9th.—Pulse 120; rather firmer than yesterday; appetite moderate; food consisting principally of eggs, milk, jellies, and gruels, with softened bread. Edges of the tongue less sore; bowels regular, and evacuations more natural in appearance; urine free and natural; slight soreness in the part, with scarcely any discharge.

10th.—Not quite so well as yesterday; felt very faint last night; slept moderately as usual, but had some delirium; pulse 130; bowels regular; urine free; no great pain, but some soreness of the belly, the leech-bites having many of them suppurated; stomach tranquil. Superficial ulcers of mouth continue, with spitting out of saliva and mucus.

To use a gargle with kino, borax, tincture of myrrh and honey.

14th.—Sleep moderate; pulse 114, and of tolerable strength; complains of general soreness, but no particular pain; soreness of mouth and salivary fluid slightly diminished.

17th.—Pulse 108; a little cough, with some expectoration for the last few days, which is now relieved by using a mucilaginous linctus; soreness and slightly ulcerated state of mouth continue, though somewhat better; no discharge per vaginam.

23d.—Feels better; pulse 100, and of good strength; was dressed yesterday for the first time; remained up two hours, and ate a pretty hearty dinner; slight ptyalism and a little cough continue.

24th.—To-day I examined the state of the parts, just three weeks since the uterus was removed. The vagina appeared to be short, perhaps between two and three inches long, having at its upper part in the middle a small opening, feeling to the finger very like the natural os internum; it would admit the tip of the finger, but as the attempt gave her pain, I desisted from pushing it further, since it was from a promise not to give her pain, that I with difficulty obtained her permission to make the examination. From this, however, we have reason to conclude that the dilated os uteri, after the distending cause is removed, soon returns to its naturally contracted state.

October 11.—I met her walking out alone in the street to-day, which she has done for several days; she still looks pale and delicate, but has no complaint; has a good appetite, and is improving fast.

November 16th.—Has now regained a very comfortable state of health, is considerably stouter, and her complexion, though naturally pale, is much improved; is able to go about, and to superintend the bakehouse. To-day I carefully examined the state of the vagina, and both it and the os uteri (which as usual projected somewhat into the vagina) did not appear to me to deviate at all from the natural condition. It is three inches in length at the posterior, and two and a half at its anterior part; the long diameter of the os uteri is directed laterally, and will admit the tip of the middle finger. There has been no sanguineous discharge since the operation, nor has any disposition to prolapsus of the os uteri as yet manifested itself.

Before concluding the subject I shall offer a few suggestions on the best mode of removing the uterus, in those cases of inversion, where palliative means are insufficient to arrest the fatal tendency of the disease; and this more for the purpose of inviting others to the subject than from any thing important that I can produce.

In Mr. Newnham's operation, the separation of the uterus was accomplished by the ligature only. In the above case it was effected partly by ligature and partly by excision.

To the patient the operation by ligature is certainly very tedious and very painful, (though perhaps amply compensated by future comforts and prolongation of life); to the surgeon it is fraught with protracted anxiety for the event. Would it not therefore greatly curtail and diminish the patient's sufferings, and the practitioner's suspense of mind, if the excision of the uterus could be safely adopted at once instead of the slower action of the ligature? We have on record cases where excision of the uterus seems to have been followed by recovery; but much will depend on the care of the operator, and on the constitution of the patient. We have, however, one case where the operation was performed under very unfavourable circumstances. In this case, mentioned by Wrisberg, and related at considerable length by Dr. Hull, p. 119, 126, Letter II. the uterus was cut away by an ignorant midwife, immediately after the inversion, and consequently the peritoneal cavity (if I may use the expression) must have been extensively opened, yet the succeeding inflammation was rather of a sanative than destructive nature, and the patient recovered.

Where inversion occurs, the uterus, I believe, is generally contained in the cavity of the vagina, the ovaria and fimbriated ends of the fallopian tubes lie here on the brim of the inverted part, but not within it, as I have seen in one case: probably these parts become somewhat agglutinated by adhesive inflammation, and also connected by the same process to the bladder before and to the rectum behind; and hence there may be less danger of opening the peritoneal cavity if excision is practised in the chronic stage.

In some cases, either originally or by time, the peritoneal connexions becoming elongated, the inverted uterus may have its fundus projecting beyond its external parts; and here the ovaria and fimbriated ends of the fallopian tubes may be within the cavity of the inverted uterus.

In the above case of Harriet Barwick, adhesive inflammation had not connected the opposite peritoneal surfaces where the uterus was separated, but it might previously have occurred higher up, thus diminishing the danger of general peritoneal inflammation in the operation.

After the protruding uterus is removed, the os uteri seems to be soon restored to its contracted state, which will assist in preventing any prolapsus of the abdominal viscera through this part.

Before practising excision, it would probably be best first to secure the uterus above by a ligature, in order that any hemorrhage might be more easily commanded; in a day or two the adhesive inflammation might be powerful enough to prevent any further danger of hemorrhage, and the ligature might then be safely removed.

If, however, the ligature should be preferred to the operation by excision, the process of separation might be considerably accelerated by passing a needle through the uterus, and using two canulæ instead of one, each ligature comprehending half of the uterus, nearly in the same way as the tonsils are tied; a process suggested by Dr. Hull.

After the uterus is separated, the truncated cervix seems to recede a little, the os uteri contracts, and the vagina is restored to its natural state.

P. S. *Nov.* 15th, 1819.—Harriet Barwick has now, for a considerable time, enjoyed a very excellent state of health.

DESCRIPTION

OF AN

URINARY CALCULUS,

COMPOSED OF THE

LITHATE OR URATE OF AMMONIA.

By WILLIAM PROUT, M.D. F.R.S.

Read June 22, 1819.

M. FOURCROY had stated that the Lithate of Ammonia not only frequently enters into the composition of urinary calculi, but sometimes constitutes entire concretions[*]. Mr. Brande, some years afterwards, called this statement in question, and was induced to conclude from his experiments, "that no substance which can be called urate of ammonia exists in calculi[†]." In this latter opinion I believe most British chemists have acquiesced, and Dr. Marcet, in his recent work on this subject, observes, "the presence of this substance (lithate of ammonia) in urinary calculi I still think very doubtful, especially because, since it is so easily discoverable in the excrements of the Boa Constrictor, it is not probable that the English chemists would have overlooked it so long in the human calculi, which they have so often and so successfully submitted to chemical examination*.

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[*] Système des Connaissances Chimiques, tom. x. p. 224.

[†] Philos. Trans. vol. xcviii. p. 231.

From these decided opinions of such eminent chemists we must conclude that this variety of calculus is extremely rare: to obviate, however, the belief that it does not exist at all, I have been induced to draw up the present account, the object of which is to describe a calculus composed almost entirely of the substance in question.

This calculus, for which I am indebted to my friend Dr. Elliotson, was extracted in April last by Mr. Cline, jun. from a boy about two years of age, in St. Thomas's Hospital; when entire it weighed about fifty grains; its general shape was ovoid a little flattened; its external surface was smooth and of a greenish clay colour (corresponding nearly to the *wax-yellow* of Werner†). It was composed of thin concentric layers, easily separable from one another, and readily breaking into sharp angular pieces, with a compact earthy fracture. Its general colour internally differed both in shade and intensity from that of its external surface: it might be denominated a pale reddish clay colour (corresponding nearly to the *wood-brown* of Werner[*]). The different layers, however, differed somewhat in intensity, which caused the laminated structure to be visible to the eye. Between some of the layers also there were minute depositions of the earthy phosphates, which rendered this structure still more sensible. The nucleus exhibited the same general appearance as the rest of the calculus, except that it appeared to be made up of a fine powder and a few larger grains, loosely agglutinated together.

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* Essay on the Chemical History and Medical Treatment of Calculous Disorders, p. 140, first edition. See also Dr. Henry's Paper in the first Part of the present Volume.

† See Werner's Nomenclature of Colours, by Patrick Syme.

It was sparingly soluble in cold water[†], but it dissolved readily in boiling water, (especially when in a state of fine powder,) requiring only about three hundred times its weight for that purpose. On cooling, the calculous matter did not immediately separate, but after some days a great part of it was deposited.

It readily dissolved in solutions of the fixed alkalies, and at the same time a strong smell of ammonia was exhaled. When muriatic acid was added to this solution lithic acid was precipitated.

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[*] See Werner's Nomenclature of Colours, by Patrick Syme.

[†] One part of the excrements of the Boa Constrictor (which is lithate of ammonia) at 60° required about 480 parts of water to dissolve it.

at 90° 360

at 212° 240

But the calculus above described was found to be somewhat less soluble than this substance, probably on account of its compact state of aggregation.

In nitric acid it dissolved readily, especially with the assistance of heat, exhibiting the same phenomena as lithic acid when similarly treated.

Muriatic acid, in which it had been digested, was found to be converted into muriate of ammonia.

Exposed to the action of heat by means of the blowpipe, it decrepitated so strongly that it was difficult to ascertain the effects produced by this agent. When reduced to powder, and exposed to heat, it first appeared to give off ammonia, and afterwards to burn with the same phenomena as lithic acid. It left a minute residuum, which strongly reddened turmeric paper, and appeared to consist partly of lime (and alkali) and partly of the earthy phosphates.

From these proportions it is evident that this calculus consisted principally of the lithate of ammonia*.

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* The following is Fourcroy's description of this species of calculus, which does not differ much from the above. "Les calculs d'urate d'ammoniaque, bien charactérisés par leur dissolubilité dans les lessives d'alcalis fixes caustiques, mais avec un dégagement abondant d'ammoniaque, sont ordinairement petits, d'une couleur pâle de café au lait, ou d'un gris tirant sur cette nuance, formés de couches fines qu'on détache facilement les

unes

The boy from whom this calculus was taken suffered extreme irritation, and his general health was much deranged. Two or three weeks before it was extracted, I had an opportunity of examining his urine; it was pale-coloured, and exhibited the appearance it usually assumes when a calculus is present in the bladder, or when the functions of the inner coat of that viscus are otherwise deranged. Its specific gravity was 1023.8, and it abounded in urea and the triple phosphate of magnesia and ammonia. It reddened turmeric paper, but as it had been kept for some days before I had an opportunity of examining it, this property might have been acquired after it was voided from the bladder.

I possess a fragment of another small calculus, having precisely the same colour and properties

unes des autres, et qui sont lisses par les surfaces qui se touchent; presque toujours contenant un noyau dont on sépare aisément l'enveloppe. Leur forme la plus ordinaire, est sphéroidale, alongée, comprimée, quelquefois amygdaloide; leur surface est ordinairement lisse, jamais tuberculeuse, quelquefois brillante et crystalline; leur pesanteur spécifique va de 1.225 à 1.720, l'eau seule les dissout, surtout quand elle est chaude, et quand ils sont divisés et en poussière fine. Les acides, le muriatique surtout, leur enlèvent l'ammoniaque, et laissent seul l'acide urique, qui se dissout ensuite dans la potasse sans effervescence: ils se trouvent quelquefois recouverts d'acide urique pur: la couche extérieure de celui-ci est ordinairement peu épaisse, et la plus grande quantité du calcul est de l'uraie d'ammoniaque. Sur les 600 calculs examinés la proportion du nombre d'individus de cette espèce a été une des plus foibles." Op. cit. p. 237.

as that above described. It was likewise taken from a boy under the age of puberty, and was accompanied by great irritation. This fragment, which is about one-tenth of an inch in thickness, appears to have constituted a part of the outer crust. Its external surface is rough, and covered with mamillary protuberancies. To a part of its internal surface there is adhering a portion of a common lithic acid calculus; probably, therefore, the whole of its centre was composed of that substance. This boy, as well as the former, recovered from the operation, and I believe neither has ever had any return of the complaint.

The characteristic properties of this species of calculus appear then to be the following:—1st, their colour and general appearance, which are peculiar; 2dly, their solubility in water; 3dly, their yielding ammonia when treated with the fixed caustic alkalies. To which, perhaps, may be added, 4thly, their property of decrepitating before the blow-pipe[*].

There are also strong reasons for concluding, from the smallness of their size, and other circumstances, that this species of calculus, in its pure state, is peculiar to children under puberty*, and that it is accompanied by great derangement of the general health, and the most distressing irritation.

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[*] I am aware that decrepitating calculi are usually said to contain a little oxalate of lime, and this was perhaps the case in both the above instances. In these instances, however, the decrepitation appeared to me rather to depend on the escape of ammonia.

With respect to the *medical treatment* of this variety of calculus, it ought probably to differ in no respect from that adopted in ordinary cases of the lithic acid calculus; certainly not at least in a *chemical* point of view.

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[*] The morbid urine of children generally contains an excess of the phosphates, but in some rare instances a peculiar clay-coloured deposition takes place after the urine has cooled, which, if I am not mistaken, consists partly of lithate of ammonia.

CASE OF A
PRESENTATION OF A BAG OF WATER
AFTER DELIVERY,
UNCONNECTED WITH
PLURALITY OF CHILDREN.

BY JOHN DUNN, ESQ.

COMMUNICATED

BY DR. ROGET.

Read June 22, 1819.

AN extraordinary case of midwifery occurred to me last month, in the person of Ann Reid, of Pickering, a woman of a full habit, and forty-seven years of age. This was her first labour; her pains had been regular; the presentation natural; the membranes, from her own account, had broken, as she had a little discharge of water when I was called in, and I could feel the head without the membranes covering. After having been delivered of a girl in the ordinary manner, her pains left her, and I waited for half an hour for the expulsion of the placenta.

Friction on the abdomen having been tried in vain, to excite the action of the uterus, I gently pulled the cord, and occasioned a slight effort, but still, on introducing my finger into the vagina, I could not perceive any portion of the after-birth. By keeping the cord stretched, and rubbing the abdomen, a complete labour pain came on; the perineum was quite stretched out; and a bag containing at least a pint of water presented at the os externum: this I ruptured with my finger and thumb, and the contents escaped with a slight noise, as is usual when the membranes are tense. From such a circumstance, together with the retention of the placenta, I concluded a second child was at hand, although I could not perceive it with my finger. I remained four hours with my patient, and she had not the least pain; I could perceive no presentation on examining per vaginam, and the placenta was as fast as ever. From her uncertain condition, and an anxiety of mind, to be expected on this occasion, I determined upon introducing my hand to the uterus; when, to my astonishment, I could perceive nothing but the placenta adhering to the uterus. The introduction of my hand excited the action of the womb, and, by gently insinuating my fingers between the placenta and uterus, I obtained a separation of three-fourths of the former, but towards the right side the adhesion was so firm as to appear almost cartilaginous. My hand remained in the uterus above twenty minutes before I could detach this adhering portion of the placenta, but by persevering in the insinuation of my fingers, I at length obtained it in one entire mass, although the investing membrane was a little torn at the point of adhesion. My patient complained of no particular symptoms during gestation, except a continued chronic pain in the side of the adhesion. She has rapidly recovered, was free from pain, and the child is quite healthy and perfect.

This case may be more curious than useful; but still it will serve to guard our prognosis, and make us cautious in deciding upon the existence of twins, before we have actually felt the second child. That two bags might exist, or one divided by a septum, is not impossible to believe, considering the many anomalies that have already been observed both in the formation of animals and vegetables. I have seen a double uterus and vagina, and I think the specimen is in Mr. Brookes' Museum; and how many other instances of monstrosity have been recorded! It may be conjectured that a fold of the membranes might be so turned, by the action of the uterus conjoined with an immediate contraction of its mouth after the expulsion of the fœtus, as to block up the escape of the fluid; but when we consider what a wide breach must be made for the passage of a child's head and body, and the perfect presentation of a bag of water, actually requiring laceration for the discharge of its contents, the distention of the perineum, and the partial adhesion of the placenta, which must have been connected with original formation, the former presumption seems the most conclusive.

Pickering, Yorkshire,
Dec. 29th, 1817.

OBSERVATIONS ON THE RELAXED RECTUM,

By THOMAS CHEVALIER, Esq. F.R.S. & F.L.S.

SURGEON EXTRAORDINARY TO THE PRINCE REGENT, AND
CONSULTING SURGEON TO THE WESTMINSTER GENERAL DISPENSARY.

Read Nov. 23, 1819.

A RELAXED state of the coats of the intestinal canal, admitting of excessive distension, is not of unfrequent occurrence. In most cases of peritoneal inflammation, whether acute or chronic, it is one of the earliest symptoms which arises, and affords a remarkable illustration of the pathological fact, that an inflammatory excess of action in the vessels of a part, is always accompanied with a loss of its tone. In this instance the inflammation is aggravated by the distension, and that distension rapidly increases in consequence of the adhesions which form between the convolutions of the intestines, and which, by arresting their peristaltic motion, tend greatly to disable them from expelling their contents.

Parts of the canal, however, may become relaxed, and over distended in consequence of that relaxation, with little or no inflammation, and probably arising from a loss of tone simply. The large intestines seem more subject to this derangement than the small ones, and the transverse arch of the colon is especially liable to it. The extreme distension of the abdomen in tympanites is chiefly produced by the extraordinary degree in which this part is dilated. A less degree frequently accompanies ascites, and sometimes occasions an apprehension in the mind of the physician that there is a much larger quantity of fluid in the abdomen than is actually accumulated. In such instances, the fluctuation is more obscurely perceived, and it is chiefly at the lower part of the abdomen: the enlargement is greater above the navel than below it, and when the upper part of the belly is struck gently by the hand, it gives that peculiar sensation and sound which a membranous cavity filled with air communicates. This circumstance deserves the most careful attention on the part of the surgeon, who might otherwise be induced to tap the patient, and might puncture the intestines by his trocar. I believe, however, where this state of the colon exists, that the ascites is very seldom the principal disease. I have repeatedly objected to operate in such cases, having always found in those which I have had an opportunity of examining after death, that the quantity of fluid has been much less than had been expected, and that it has been irregularly effused among partial adhesions, which have been excited by the irritation of some visceral disease. If it should be thought adviseable in such a case to puncture the abdomen, the operation should be performed by the cautious introduction of a lancet through the linea alba below the navel, and not by a trocar.

Dilatations occasionally take place on the sigmoid flexure of the colon, the sacculated subdivisions of which prevent their dilated portions from being equally distended. From this cause scybala are often formed of the excrementitious matter, and may be retained for a considerable time by the valvular projections of its internal coat, although a tolerably regular evacuation of fæces may go on. These are well known to give rise to dysenteric affections, and inflammations of the inner surface of the bowel, in relieving many of which, copious and repeated glysters are of the most essential service, by softening and washing out the hardened substance.

That the lower part of the rectum is frequently so relaxed as to prolapse externally, is well known; but it does not appear to have been much observed by practitioners that it is also subject, without any external protrusion whatever, to excessive dilatation within the pelvis, and to a semiprolapsus of its upper part into the lower. But this is a state of that bowel which frequently occurs. It is often productive of very distressing symptoms, and it is especially to be remarked, that it is a common cause of that obstinate and habitual costiveness, under which some persons continually labour.

The rectum commences from the colon, close to the last vertebræ of the loins, and passing down into the hollow of the sacrum, it takes the curvature of that bone, in which it lies comparatively loose, invested anteriorly, but not posteriorly, by the peritoneum. When it reaches the os coccygis, it quits the peritoneum entirely, and is connected loosely by cellular membrane to the bladder, to the muscles of the perineum, to the levatores ani, the sphincter ani, and the common integument. This lower portion of the rectum is easily distensible; but while it is in a natural state, the peculiar sensibility of its internal surface speedily excites it, when moderately distended, unless the fæces are unnaturally hard, to expel its contents, and its muscular fibres are competent to enable it to do so, with a very moderate assistance from the action of the abdominal muscles. It is needless to say of how much consequence it is to the general health that the sensibilities of this important organ should remain unimpaired, and that strict attention should be paid to the regular performance of its functions: if this be long neglected, its natural sensibility becomes gradually diminished; it will remain overcharged for an undue time; the energy of its muscular fibres will become impaired, so that a more forcible exertion of the abdominal muscles will be required to expel the stools, and not unfrequently this will also be insufficient, without some medicine be taken to quicken the action of the whole intestinal canal.

Here perhaps in a majority of cases, the evil stops. The calls of nature must be obeyed, and therefore persons who feel a difficulty in discharging the excretions regularly, are of necessity excited to employ those means which afford them the requisite assistance.

But in some instances, and these by no means rare, the lower part of the rectum becomes so frequently overloaded, and its irritability in consequence so much diminished, that it becomes excessively dilated, and almost loses the power of contracting upon its contents; the natural consent between that and its upper portion, which is covered by the peritoneum, and remains undilated, is thus weakened and further evil is induced. The superior portion of the rectum and the lower part of the colon, become also overloaded, and the deficiency in the action of these parts calling forth a greater exertion of the abdominal muscles, in the expulsion of the fæces, the upper, undilated portion of the rectum, is forced downwards into the lower and dilated portion, where it may be distinctly felt like a loose bag, of which it is sometimes difficult to detect the aperture; the finger or a bougie being more likely to get entangled at the rim of this elongated fold, than to pass exactly into the continuation of the tube.

It is under these circumstances that the chief evils and perplexities of such cases begin. For the harmony of action between the upper and lower portions of the rectum being destroyed, the stools instead of being voided with that ease, and in that regular form and mass which is usual in a healthy state of the parts, are expelled with difficulty, in small and irregularly shaped pieces. The repeated efforts made for this purpose sometimes excite tenesmus, swelling of the hæmorrhoidal veins, and an increased secretion of mucus from the inner surface of the intestine; in men, the irritation is often communicated to the prostate gland, and neck of the bladder. In other instances, and especially in females, the parts become so relaxed as to allow of a sufficient accumulation of fæces to fill the whole pelvis; and how unconscious a patient may be of such an accumulation, the following case, to which others might be added, will sufficiently shew.

A lady who was afflicted with cancer of the left breast, became affected with severe pain in the loins, which confined her to bed. She soon afterwards became unable to pass her urine, which was drawn off at proper intervals by a catheter. The state of her bowels was regularly inquired into, and she always replied, that the evacuations were small in quantity, but frequent, and upon the whole, sufficient; and that this had been her ordinary habit for many years. After about a fortnight had elapsed in this way, her attendants noticed a peculiar appearance about the anus, which, on examination, was found dilated to the size of an half crown, by the protrusion of fæces, which had so stuffed the rectum, as completely to choke up the pelvis, and although not hardened, were incapable, from their quantity, of being removed without the assistance of instruments.

Sometimes *hardened* fæces accumulate in a similar manner, and become, from their bulk, incapable of expulsion without artificial aid, and yet that which is softer may pass over this lump in daily evacuations, and thus conceal the real mischief.

In more confirmed cases of the disease, and in persons of a sedentary habit, other bad consequences arise. The upper portion of the rectum being forced down as has been described, by a half intus-susception upon the lower, becomes in time less competent to its own functions, and transmits the fæces irregularly. The lower portion of the colon participates in this difficulty, and is kept in a state of irritation. An obscure heavy pain is felt in the lower part of the loins and the region of the sacrum; and the difficulty and imperfection with which the stools are voided, often gives rise to a suspicion that there is a stricture formed in some part of the intestinal tube; and this suspicion, although entirely groundless, will be confirmed in the apprehension both of the patient and his attendant, if, on making an examination with a bougie, its point should be arrested, as it is very likely to be, in the edge or fold of the semiprolapsed portion of the gut.

Under these circumstances, an increased secretion of mucus from the surface of the colon may take place, to a considerable amount, so as to collect in some of its sacculated portions, and to be voided in a large quantity; and as it then has often a yellowish appearance, it seems as if an abscess had burst, and its contents had been discharged by the anus. But the matter is more tenacious than true pus; it is not mixed with blood; that degree of relief and change from former feelings, which is always felt when an abscess breaks, is not experienced; the discharge does not go on regularly; it is seldom seen above twice or thrice, and then this symptom disappears. I have several times known more than half a pint of this purulent looking mucus so voided, and then there has been no more for several days, or but once, and in some instances it has not recurred at all. A circumstance of this nature is sure to attract the patient's attention, and if mild and demulcent aperients are given, and temporary symptoms properly treated, all goes off: and the patient becoming more vigilant over the state of his bowels than formerly, the parts affected may greatly recover their health and tone, and he may be better than he had been for a considerable time before this occurrence took place.

The state of the rectum I have now been describing, is most common to females, and to persons who, from their habits being generally sedentary, are more apt to overlook the irregularities of its action, and to defer obedience to the calls of nature. Under these circumstances, purgative medicines are mostly resorted to, and the whole intestinal canal is teased and pained, for the defective action of that very part of it which is most remote from their influence. The general health also often suffers; all the evils arising from costiveness taking place, and hypochondriacal dejection and gloom oppressing the mind.

In cases of this kind, the principal and most certain relief is to be obtained from the proper employment of glysters, the composition of which is to be regulated by circumstances. At first those of a mild aperient nature should be preferred, and thrown up by a syringe; and these should be repeated *after regular intervals*, so as to re-accustom the rectum to empty itself in an *habitual* way. Gruel, the decoction of mallows, broth, or milk with some honey, will answer the purpose very well; but more permanent good will be derived by using afterwards the infusion of chamomile, or the old decoction *pro fotu*, which by gently stimulating the torpid surface of the bowel, may bring on a proper contraction of its coats. Where the very lowest part of the rectum continues so dilated as to allow the upper still to descend, from four to six ounces of a strong decoction of oak bark, or an infusion of galls, thrown up as gently as possible every night, will be attended with the most beneficial effects. If this be not readily retained, a little starch, or a few drops of tincture of opium, or both, may be added to it; and care should be taken at the same time so to regulate the diet, and medical treatment, that the upper part of the intestinal tube may be excited to due action, regularly, but not violently.

Should inflammation take place, which sometimes happens, at the prolapsed part, so as to consolidate the surfaces together, a permanent stricture or obstruction is formed, which, by the frequent irritation to which it must be unavoidably exposed, may take on a cancerous character, and be productive of the most disastrous effects.

ON

AFFECTIONS

OF THE

MEATUS AUDITORIUS EXTERNUS.

BY HENRY EARLE, ESQ.

SURGEON TO THE FOUNDLING HOSPITAL, AND ASSISTANT SURGEON
TO ST. BARTHOLOMEW'S HOSPITAL.

Read Dec. 21, 1819.

THE sense of hearing is so important to the safety and happiness of mankind, and a partial or total loss of it deprives us of so many sources of information and pleasure, that it is certainly to be lamented that the treatment of the diseases of the ear should have been so long and so generally neglected by the Profession at large. It will not, I trust, be deemed presumptuous in me to express a hope, that from a judicious application of the improvements which have taken place in modern surgery, to the treatment of these diseases, some benefit may yet be derived; and perhaps some affections of the internal organ, hitherto considered incurable, may be arrested in their progress by the early adoption of the most active and powerful measures. Should, however, our hopes of affording relief in the more obscure diseases of the labyrinth, prove fallacious, we may yet be able to discover causes of deafness in the external ear and cavity of the tympanum, which have not hitherto been described, and which may partake of the nature of diseases affecting other parts of the body, and readily yield to the operation of known remedies.

I have been induced to make the above remarks, and to believe that much remains to be investigated in this unexplored path, from having met with an affection, which I shall proceed to relate to the Society, and which has I believe been wholly overlooked, though it is by no means improbable that it may have been not unfrequently the cause of deafness.

In the early part of 1816, Mr. F. an ensign in his Majesty's service, called to ask my opinion respecting a complaint in his ears, of which he gave the following account:

That from childhood he had been occasionally liable to attacks of inflammation in the external ear, accompanied with heat, excoriation, and a copious thin discharge from the passage, which affected his hearing, more or less, for several weeks, but left no considerable permanent deafness behind. About ten months before his application to me, he had been exposed to damp, and, in consequence, suffered a very severe renewal of the same disease, which so nearly deprived him of the power of hearing, as to oblige him to leave his regiment, then quartered in Ireland, in pursuit of further advice, with an understanding that unless he could obtain some relief, it would be necessary for him to quit the service, as he was quite incapacitated from active duty, by not being able to hear the word of command.

On examination, I found the meatus of either ear much narrowed in its calibre, by the thickening of the surrounding parts, and especially the great increased density of the cuticle, which had a very white appearance, and was moistened by a thin discharge, resembling runnet whey, that deposited a substance not unlike small portions of curd. On washing this away, and dilating the passage with a little instrument, which I had constructed for the purpose of examining the external meatus, there was not the slightest appearance of cerumen; but the same white thickened cuticle appeared to extend as far as the eye could reach.

The sense of hearing was nearly lost, but a watch applied to the teeth or forehead was distinctly audible, a circumstance which convinced me that there was no defect in the auditory nerves. On throwing in water with considerable force, a dull obtuse sound was produced as if some dense medium were interposed. This led me to imagine that it was possible that the deafness depended either on a thickened state of the cuticle reflected over the membrana tympani, similar to that which lined the meatus, or on some morbid secretion existing between this cuticular layer and the membrane. This idea was strengthened by passing down a probe to the bottom of the meatus, which conveyed a sensation to my touch different from that which would have been produced by the contact of a healthy membrane; whilst at the same time it did not cause that painful sensation usually expressed by the patient in these circumstances.

After a little reflection, and entertaining this view of the subject, I thought myself warranted in attempting the removal of the whole cuticular lining of the meatus externus. I hesitated less in making this experiment, as all common remedies had been resorted to in vain, and the case appeared almost hopeless, unless some new mode of treatment could be devised.

To effect this removal, I had recourse to the nitrate of silver, which I had often found beneficial in causing exfoliations of thickened cuticle from the feet, producing what are commonly termed corns.

I threw in with a silver syringe a very strong solution, and completely blackened the epidermis of the meatus.

In a few days, I began to syringe with warm water, conceiving that maceration would contribute to the speedy separation of the exfoliations. After persevering for several days, for a considerable time each day, it began to be detached in small portions at first, but subsequently in larger pieces, one of which, from its form, was very evidently the reflected layer which had covered the membrana tympani. The next syringe-full which I threw in occasioned to the patient a very distressing sensation and loud sound. His hearing from this time was greatly improved, but still rather confused. The other ear was treated in the same way with similar success. In a few days the hearing was very nearly restored.

From the time of the separation of the cuticle, the treatment consisted in the application of ungt. hydrarg. nitratis ʒiv. cerati cetacei ʒiij. olei olivæ ʒj. He was directed to introduce a little of this, night and morning, with a camel-hair pencil; this was recommended with a view to stimulate the ceruminous glands to a more healthy secretion. Blisters were also directed to be applied behind the ears, and to be kept open for some time with the same intention. Soon after this, he returned to join his regiment, and I lost sight of him until very lately, when I had the pleasure of seeing him perfectly well; and he informed me that he had never experienced the slightest return of his complaint, and could hear as well as he had ever done in his life. On examining his ears, I found that a secretion of cerumen had taken place, and the lining of the meatus had a perfectly healthy appearance.

This very favourable result induced me to reconsider the subject, and to examine most of the authors who have treated of diseases of the ear; from their silence on the subject, I am inclined to think this peculiar affection has escaped their observation. Mr. Saunders, indeed, in speaking of the herpetic ulceration of the external meatus, mentions that it is accompanied with thickening of the lining, but does not seem to have suspected that a similar affection might extend to the reflected portion which covers the membrane; a state which must more or less impede the functions of that part, and, if suffered to increase, would probably terminate in permanent and complete deafness. On the ground, then, of its novelty, and from a wish to have the subject further investigated, I have ventured to bring this case before the Society, though I am well aware that insulated facts are rarely deserving the attention of the public, and ought at all times to be received with caution.

The cause of this thickened state of the epidermis may, I think, be traced to the thin ichorous discharge which takes place in the room of the healthy cerumen. It is well known that cuticle, in common with other substances possessing the same properties as the hoofs of animals, is liable to imbibe moisture, by which it becomes thickened, loses its transparency, is thrown into folds, and assumes a whitish colour. This fact is familiarly known to occur in the hands of washerwomen, and when poultices have been applied for any time. Whilst this rugous state exists, the sense of touch is rendered very imperfect; but this appearance is soon lost on the evaporation of the moisture, and the cuticle resumes its former characters and functions. There is always, however, a separation of a whitish curdly substance, which, on becoming dry, assumes the appearance of a powder, having a greyish tint, similar to that produced by scraping the cuticle with a knife. Considerable quantities of this will sometimes come away from the feet, if they have not been constantly subjected to ablution and friction, and it appears to be similar to the exfoliations which take place, on a larger scale, from the sole of the horse's hoof.

In the case now under consideration I believe that, by the continued application of moisture, the whole cuticle was thickened, and rendered opaque. Under such circumstances, it is easy to comprehend to what an extent the sense of hearing must have been impaired, as those minute and delicate vibrations of the membrana tympani, which convey the undulations of the surrounding elastic medium to the internal ear, must have been greatly impeded, if not wholly prevented.

The curd-like substance which was found in the external meatus very closely resembled the furfuraceous separation which has been described as taking place from moistened cuticle, and most probably was of the same nature, as it was collected on the surface, and could be scraped off in considerable quantity with the flat end of an eye probe. In the early stages of this complaint it is probable that the injection of astringent washes, clearing the meatus from all extraneous matter, and anointing it with some stimulating ointment, would be all that would be required: should it however be suspected that the cuticular covering of the membrana tympani was much thickened, the treatment adopted in the case above related might be had recourse to with every hope of success.

The lining of the external meatus, in common with the integuments of the rest of the body, is liable to various affections, some of which may be attended with considerable difficulty of hearing. A gentleman once requested me to examine his ears in consequence of a deafness which he had laboured under for some time. The symptoms he described very much resembled those usually attending an inspissation of the cerumen. On examination I found the whole passage choaked up with numerous scales, closely impacted together with a morbid secretion of cerumen. He had from childhood been subject to attacks of lepra vulgaris, which latterly never entirely left him, and at times spread over nearly the whole surface of his body. With some difficulty the passage was cleared of its contents. He was directed to syringe the ear every morning with a decoction of bran, or barley water, and to smear the surface with an ointment consisting of equal parts of ung. zinci, ung. hydrargyri nitratis, and ceratum cetacei. I likewise recommended him to take a strong decoction of sarsaparilla, with alterative doses of hydrargyri oxymurias. Under this treatment his general health improved much, and his cutaneous affection was mitigated. By persevering in the use of the syringe and the ointment his hearing was nearly restored.

I have met with one instance similar to the above, in which the patient, who was advanced in life, neglected to pursue the measures prescribed, and has, in consequence, been repeatedly under the necessity of having recourse to his medical attendant for the removal of the cuticular exfoliations and impacted cerumen, which never fails to afford him temporary relief.

Some time ago I was consulted by a lady on account of an affection of the ears attended with some peculiar circumstances. From her birth she had never had any proper secretion, the meatus was unusually dry, and the substance which was deposited bore none of the external characters of cerumen. She had two brothers and a sister who were all similarly affected, and one of her eldest brother's children was deaf and dumb, and the others were affected with difficulty of hearing. At times, when she had been exposed to damp, or was disordered in her health, the secretion was more abundant and much thinner; this irritated the passage, and the whole ear had an erysipelatous redness, accompanied with considerable tumefaction and distressing deafness. At the time when I saw her she had been suffering from one of these attacks, and her health was much disordered. The natural form of the ears, particularly of the right, contributed much to increase the degree of deafness. The meatus was more curved than usual, and the tragus was so long, and projected backwards so much, that when swelled by inflammation, it completely closed the aperture. To obviate this, she was continually drawing it forward with her finger, and introducing instruments into the passage, which tended much to keep up the irritation. I directed such medicines as I thought were calculated to improve her health, and endeavoured to sooth the local inflammation: still, however, the passage remained nearly closed, the sides being much approximated by the thickened state of the whole ear, apparently from interstitial deposit. To remedy this, I recommended that she should have a portion of sponge tent introduced every night into the meatus; in a short time, by this plan, the passage was considerably dilated, and her hearing much improved. She remained well for near a twelvemonth, when she again sent for me, on account of a severe erysipelatous attack in the right ear, accompanied with copious ichorous discharge. I recommended her to syringe it night and morning, and when the inflammation was a little abated, to anoint the passage with the ung. hydrarg. nitratis mitius. She improved rapidly under this treatment, and by persevering in the use of the ointment and syringe, she has experienced no return for several months, and can now hear better than she had done for many years.

This latter case shews, in a marked degree, the important part which the cerumen acts in the due performance of the functions of the ear. A deficient or vitiated secretion generally induces a diseased state of the integuments, which may become so thickened as to cause an obstruction in the ceruminous ducts, and thus maintain the disease. The cases which I have had the honor of submitting to the Society, sufficiently prove the importance of paying attention to the state of this secretion, and of the integuments which line the meatus, and will perhaps authorize us to hope, that, by the application of suitable remedies, many distressing cases of deafness may be palliated, and some permanently relieved.

10, *Berners Street,*
December 16th, 1819

NOTE, subjoined as a Postscript to DR HALL'S *Case of Chronic Inflammation of the Larynx.* Page 175.

Nottingham, April 20th.—Mrs. H. came this day to pay me a visit, and I was glad to find there had been a progressive amendment in the voice, which still, however, was rather hoarse. There was no difficulty in breathing or swallowing, and no cough. She had gained flesh, and her general appearance was altogether improved.

THE Explanation of the Plate, which refers to MR. SHAW'S Paper, "On the Structure of the Membranous Part of the Urethra," is given at Page 339.

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